

MOISTURE & DENSITY TEST							
Client : <u>URS/ARUP/HMM JV</u>			Project : <u>California High Speed Train</u>			ISI Lab No.: <u>G-52568</u> Job no : <u>2636-001.0</u>	
Boring #	S0029R	S0029R	S0029R				
Sample #	SS04	MC12-1	SS13				
Depth (ft.)	16.0-16.5	51.0-51.5	56.0-56.5				
Soil type: (visual)	Sand	Silty sand	Sand				
1. Date tested:	09/13/13	09/13/13	09/13/13				
2. Tested by:	PH	PH	PH				
3. Specimen height (in.)		4.02					
4. Wt. of specimen + tare (gm)		555.89					
5. Tare wt. (gm)		0.00					
6. Diameter (in.)		2.40					
7. Wet wt. of soil + dish wt. (gm)	324.41	288.46	328.96				
8. Dry wt. of soil + dish wt. (gm)	277.72	242.52	295.59				
9. Wt. of dish (gm)	50.55	50.39	50.95				
10. Dish ID							
Wet Density (pcf)		116.3					
Dry Density (pcf)		93.9					
Moisture Content (%)	20.6	23.9	13.6				
Gs (Assumed)	2.70	2.70	2.70	2.70	2.70	2.70	2.70
Void Ratio		0.794					
Saturation (%)		81.3					
Additional data:							
Wt. of dry soil + dish before washing (gm)							
Wt. of dry soil + dish after washing (gm)							
% Passing # 200 sieve							
USCS symbol							



Assignment Sheet / Density Test

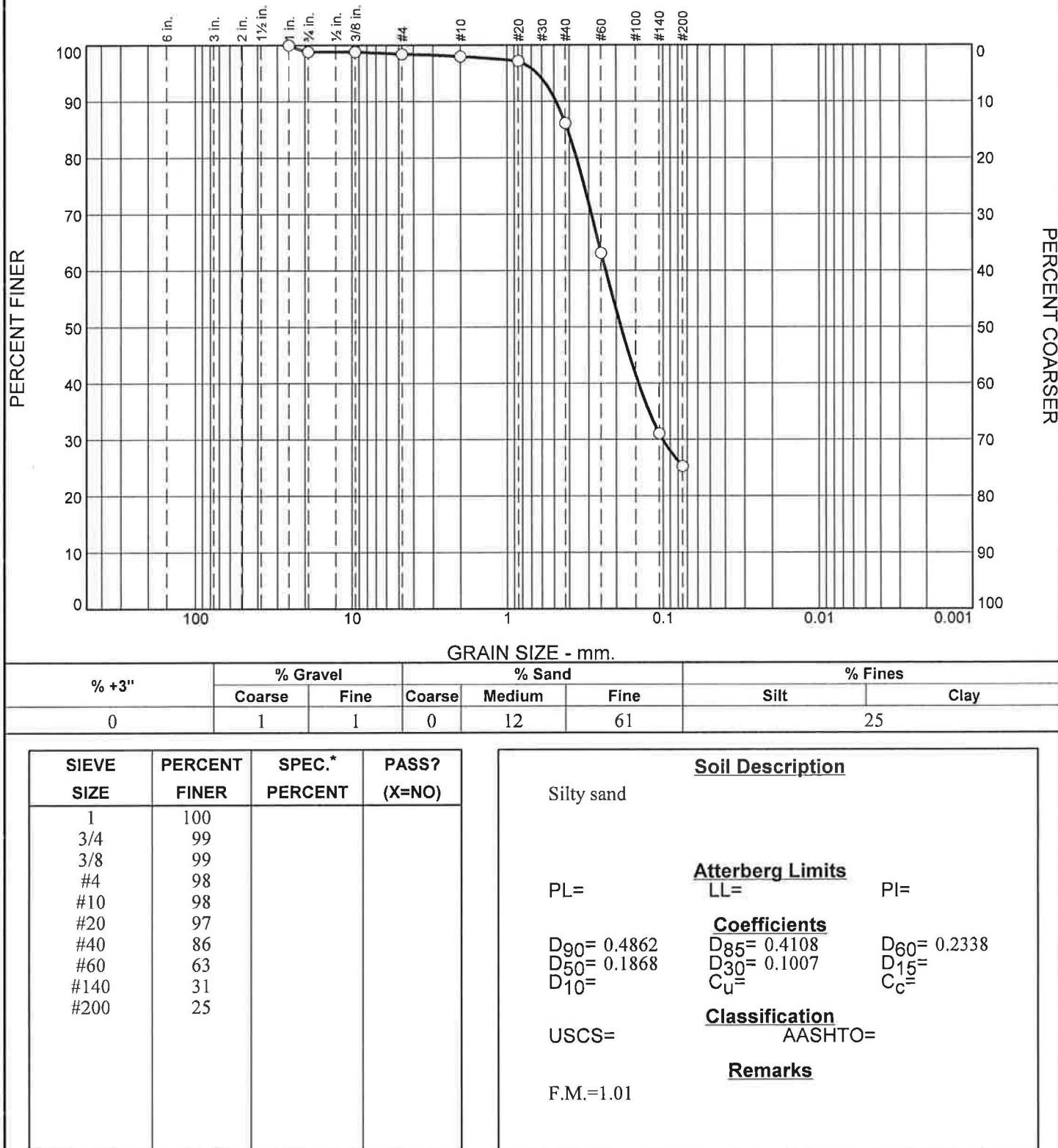
Project Number : 23502-ZS9 Lab. Tech : K. Ford
Project Name : HSR Date Completed : 1/20/14
Date Drilled : 1/8/14

Notes:

CHEM	Sulfate/Chloride	MR	Minimum Resistivity
COLL	Collapse	PH	pH Test
CONSOL	1D Consolidation	PI	Atterberg Limits
CURV	Modified Proctor	RV	R-value
DD	Moisture Density	RVT	R-value Treated
DS	Direct Shear	SA	Sieve Analysis
HY	Hydrometer	TRX	Triaxial Compression

<u>MOISTURE & DENSITY TEST</u>								
Client : URS/ARUP/HMM JV			Project : California High Speed Train					
Boring #	S0029R	S0029R	S0030R	S0033AR	S0069AR	S0069AR	S0069AR	S0069R
Sample #	MC09-2	U10	MC10-3	SS16	U11	MC16-1	MC18-1	MC02-2
Depth (ft.)	41.0-41.5	42.0-44.5	42.0-42.5	50.0-51.5	42.0-44.5	65.0-66.5	75.0-76.5	5.5-6.0
Soil type: (visual)	Grayish brown silty clay	Olive brown sandy silt	Greenish gray clayey sand	Grayish brown silt with sand (BAGGIE COULD NOT DO MD)	Olive brown sandy clay	Olive gray sandy clay	Olive brown silty clay	Grayish green clay with sand
1. Date tested:	01/17/14	01/17/14	01/17/14	01/15/14	01/17/14	01/17/14	01/17/14	01/17/14
2. Tested by:	JH	JH	JH	JH	JH	JH	JH	JH
3. Specimen height (in.)	5.96	3.93	5.90		3.96	6.00	6.00	5.95
4. Wt. of specimen + tare (gm)	900.72	868.95	815.58		880.48	951.22	956.29	897.34
5. Tare wt. (gm)	0.00	0.00	0.00		0.00	0.00	0.00	0.00
6. Diameter (in.)	2.41	2.85	2.37		2.87	2.42	2.42	2.41
7. Wet wt. of soil + dish wt. (gm)	276.47	264.91	298.04	98.44	273.64	275.82	301.24	293.74
8. Dry wt. of soil + dish wt. (gm)	229.46	229.54	247.22	90.20	239.02	239.79	257.94	255.15
9. Wt. of dish (gm)	50.59	50.41	50.06	50.96	51.20	50.87	50.41	50.89
10. Dish ID								
Wet Density (pcf)	126.1	131.9	119.3		130.8	131.2	131.9	125.8
Dry Density (pcf)	99.9	110.2	94.8		110.5	110.2	109.1	105.8
Moisture Content (%)	26.3	19.7	25.8	21.0	18.4	19.1	20.9	18.9
Gs (Assumed)	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
Void Ratio	0.687	0.529	0.777		0.525	0.529	0.544	0.592
Saturation (%)	103.3	100.7	89.6		94.8	97.3	103.6	86.2
Additional data:								
Wt. of dry soil + dish before washing (gm)								
Wt. of dry soil + dish after washing (gm)								
% Passing # 200 sieve								
USCS symbol								

Particle Size Distribution Report



Source of Sample: S0029R G-52568
Sample Number: B-01

Depth: 0-5

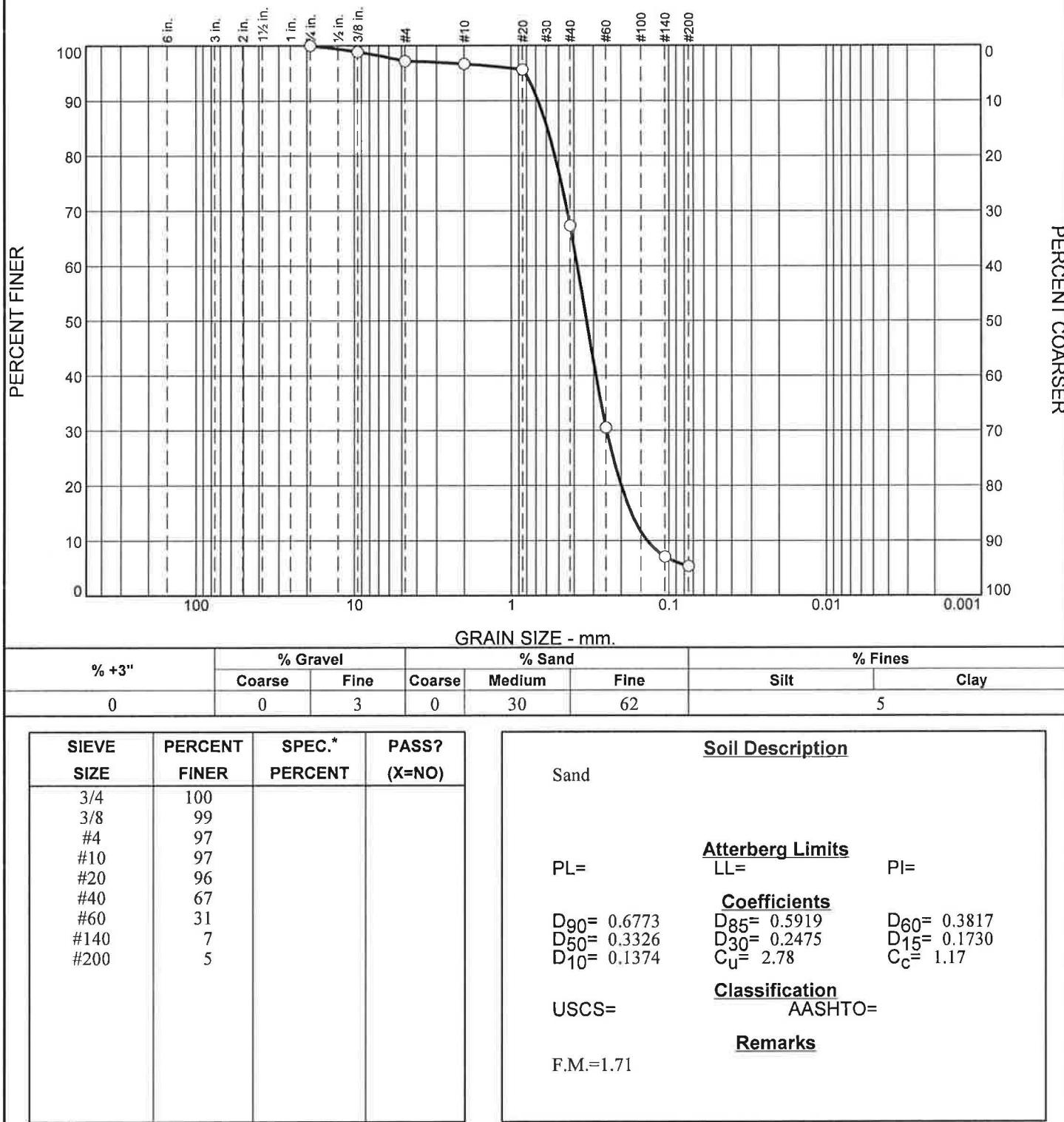
Date: 09/07/13

Client: URS/ARUP/HMM JV
Project: California High Speed Train

Project No: 2636-001.0

Figure

Particle Size Distribution Report



Source of Sample: S0029R G-52568
Sample Number: MC03-2

Depth: 10.5-11.0

Date: 09/25/13



Client: URS/ARUP/HMM JV
Project: California High Speed Train

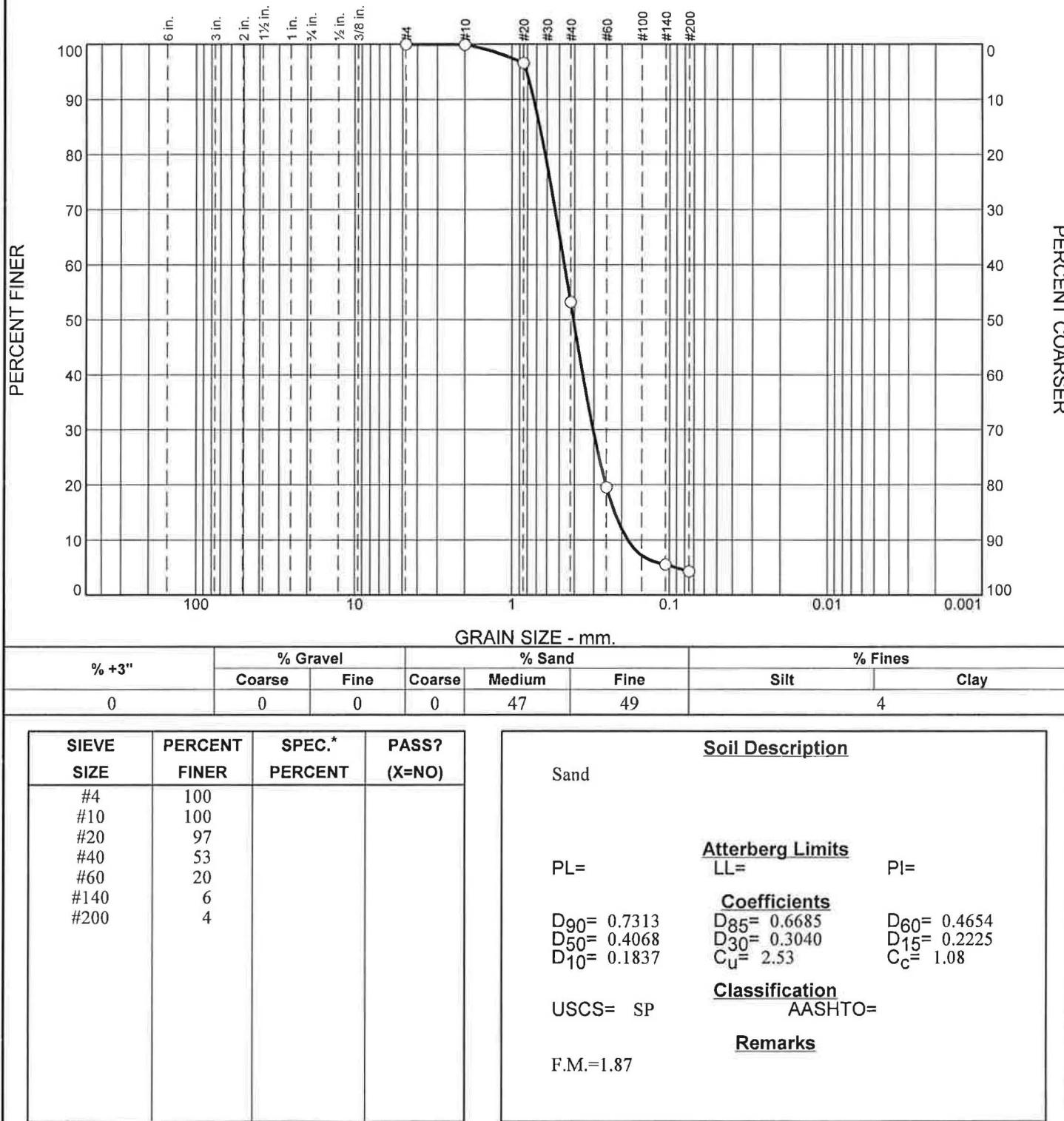
Project No: 2636-001.0

Figure

Tested By: PH

Checked By: PH

Particle Size Distribution Report



Source of Sample: S0029R G-52568
Sample Number: SS04

Depth: 16.0-16.5

Date: 09/13/13



Client: URS/ARUP/HMM JV
Project: California High Speed Train

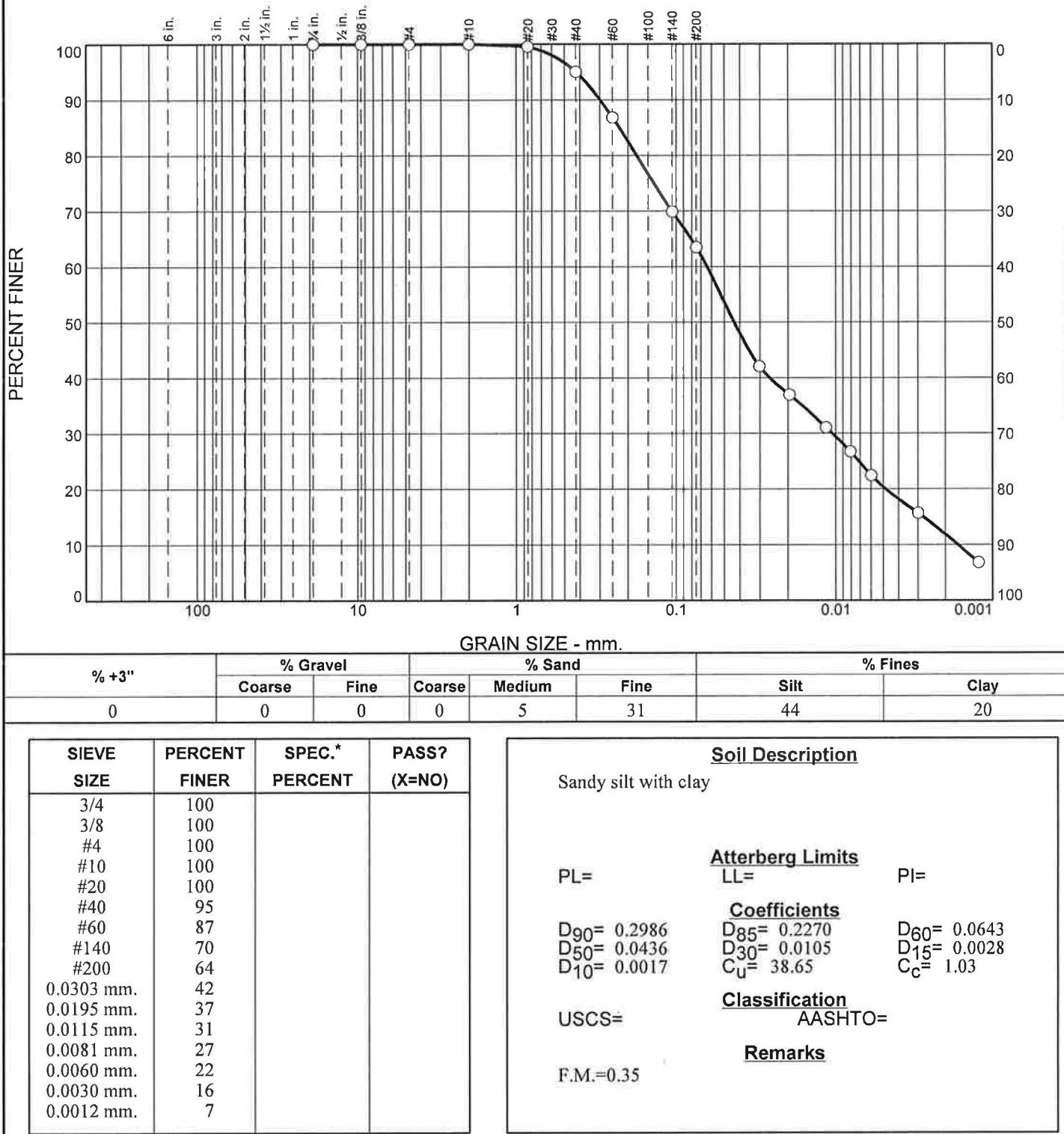
Project No: 2636-001.0

Figure

Tested By: PH

Checked By: PH

Particle Size Distribution Report



Source of Sample: S0029R G-52568
Sample Number: SS06

Depth: 26.0-26.5

Date: 09/17/13



Client: URS/ARUP/HMM JV
Project: California High Speed Train

Project No: 2636-001.0

Figure

Tested By: PH

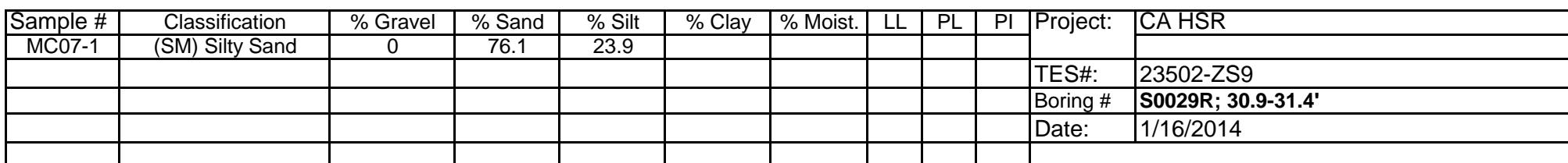
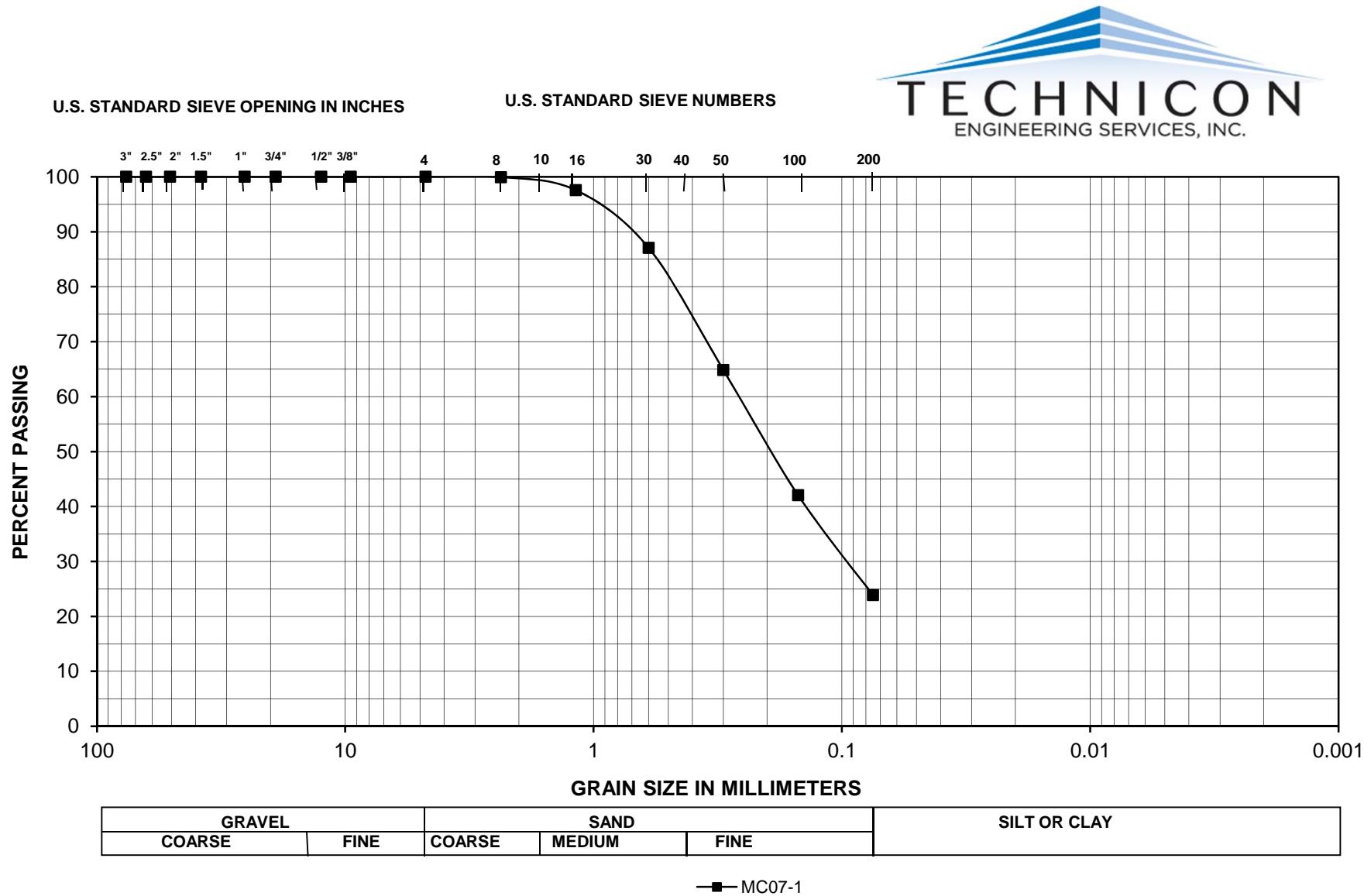
Checked By: PH



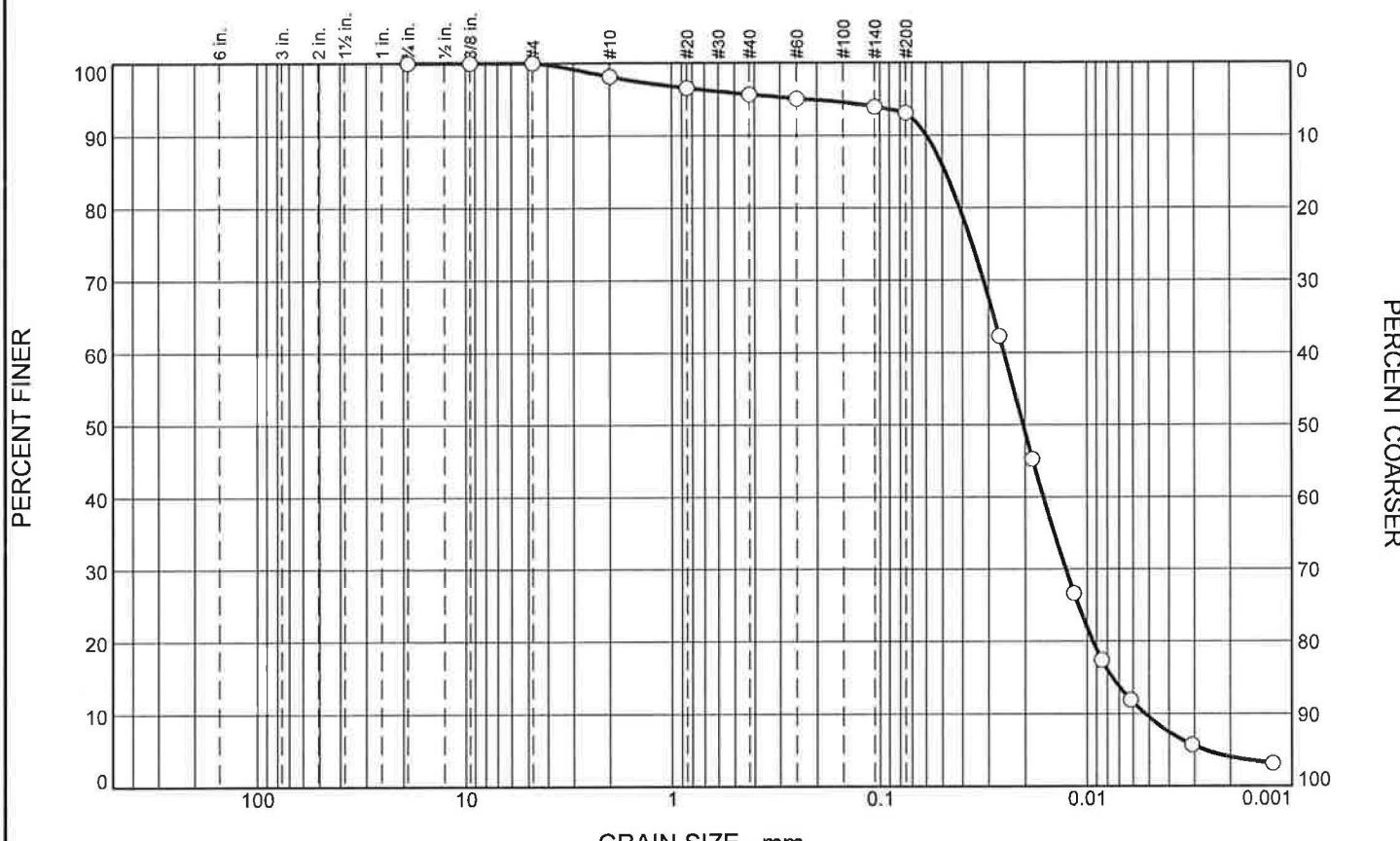
Construction Testing & Inspection * Geotechnical & Environmental Engineering

Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project:	CA HSR	Technician:	K. Ford		
TES#:	23502-ZS9	Date:	1/16/2014		
Boring #:	S0029R; 30.9-31.4'	Sample No.:	MC07-1		
		Classification:	(SM) Silty Sand		
	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)		
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)		
Tare Weight		3/8"	2.0 (1.0)		
Total Dry Sample Wt.	174.1	1/2"	4.0 (2.0)		
Initial Weight Fine		3/4"	11.0 (5.0)		
Aggregate Before Wash	174.1	1"	22.0 (10.0)		
Final Weight Fine		1 1/2"	33.0 (15.0)		
Aggregate After Wash	141.5	2"	44.0 (20.0)		
Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.1	0.1	0.1	99.9	
#16	4.2	4.1	2.4	97.6	
#30	22.5	18.3	12.9	87.1	
#50	61.2	38.7	35.2	64.8	
#100	100.9	39.7	58.0	42.0	
#200	132.5	31.6	76.1	23.9	
Pan	141.5				



Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0	0	2	2	3	83	10

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100		
3/8	100		
#4	100		
#10	98		
#20	97		
#40	96		
#60	95		
#140	94		
#200	93		
0.0267 mm.	62		
0.0185 mm.	45		
0.0116 mm.	27		
0.0085 mm.	17		
0.0062 mm.	12		
0.0031 mm.	6		
0.0012 mm.	3		

* (no specification provided)

Source of Sample: S0029R G-52568
Sample Number: SS08

Depth: 36.0-36.5

Date: 09/17/13

Client: URS/ARUP/HMM JV
Project: California High Speed Train

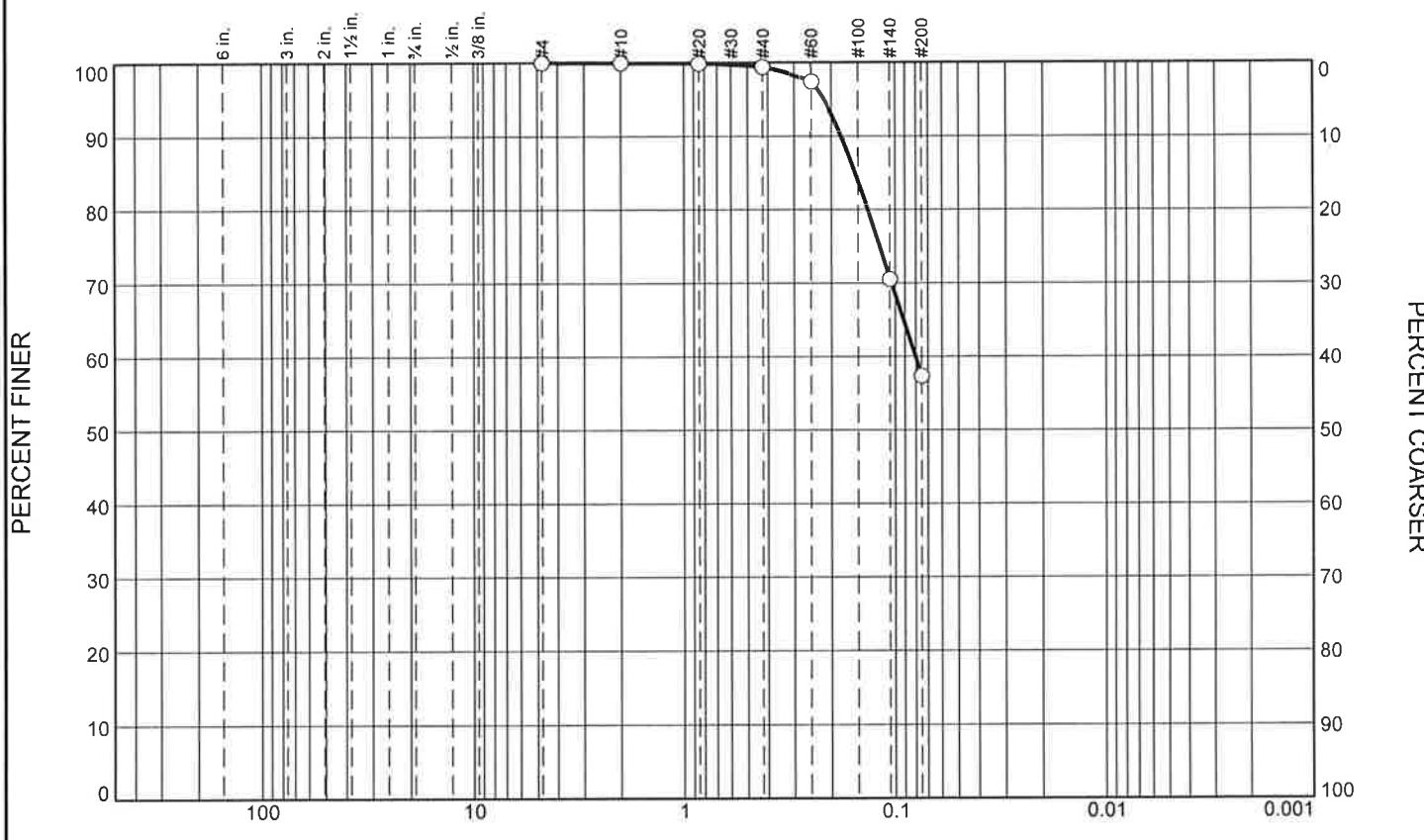
Project No: 2636-001.0

Figure

Tested By: PH

Checked By: PH

Particle Size Distribution Report



SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	100		
#40	99		
#60	97		
#140	71		
#200	57		

* (no specification provided)

Soil Description		
Olive brown sandy silt		
PL=	NP	Atterberg Limits LL= NP
D ₉₀ =	0.1809	PI= NP
D ₅₀ =		
D ₁₀ =		
C _u =		
C _c =		
Coefficients		
D ₉₀ =	0.1553	D ₆₀ = 0.0804
D ₅₀ =		D ₁₅ =
C _u =		C _c =
Classification		
USCS=	ML	AASHTO= A-4(0)
Remarks		
F.M.=0.18		

Source of Sample: S0029R G-52568
Sample Number: U10

Depth: 42.0-44.5

Date: 1/17/14



Client: URS/ARUP/HMM JV
Project: California High Speed Train

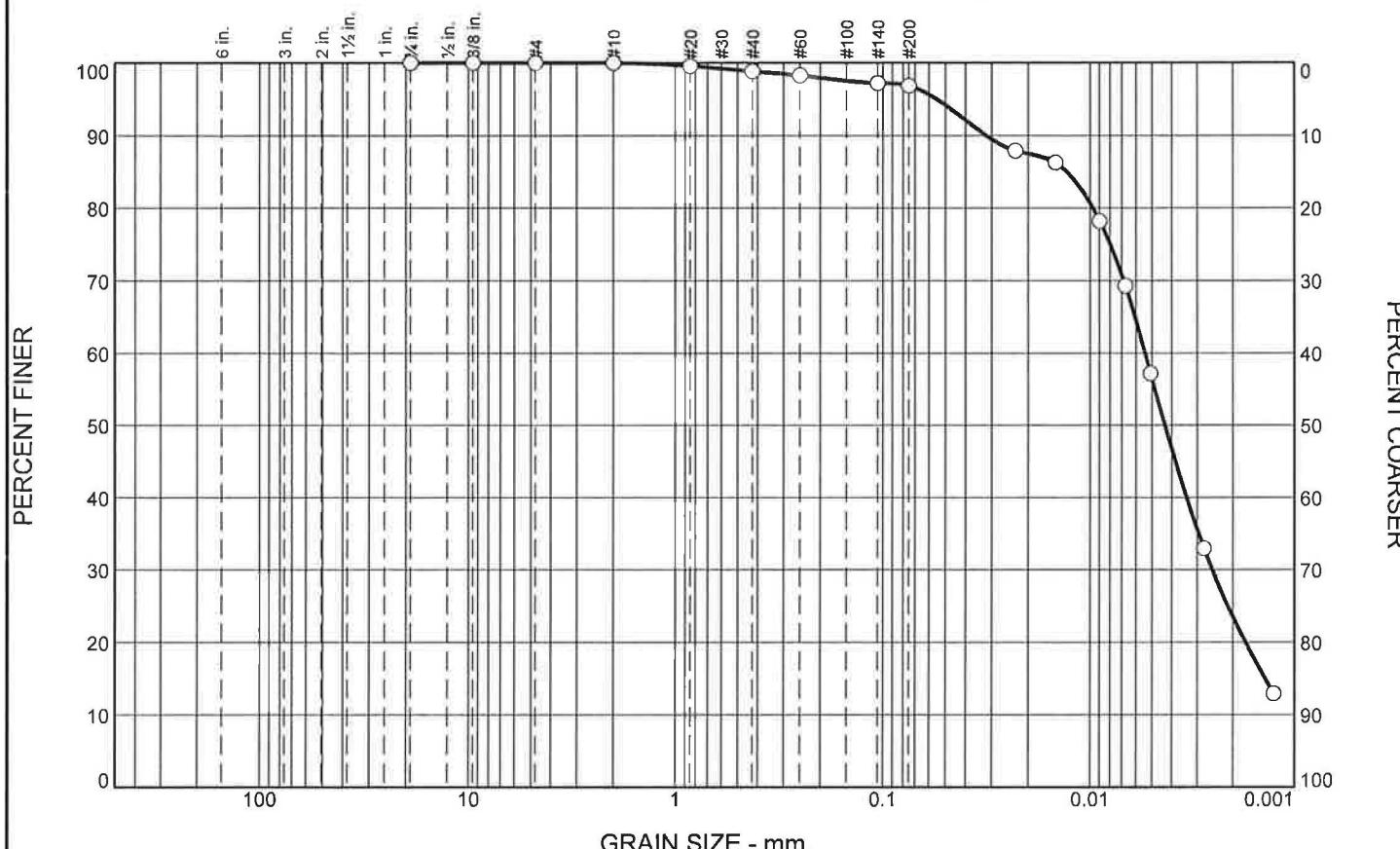
Project No: 2636-001.0

Figure

Tested By: JH

Checked By: PH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0	0	0	1	2	41	56

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100		
3/8	100		
#4	100		
#10	100		
#20	100		
#40	99		
#60	98		
#140	97		
#200	97		
0.0230 mm.	88		
0.0148 mm.	86		
0.0090 mm.	78		
0.0067 mm.	69		
0.0051 mm.	57		
0.0028 mm.	33		
0.0013 mm.	13		

* (no specification provided)

Source of Sample: S0029R G-52568
Sample Number: S11

Depth: 46.0-46.5

Date: 09/19/13

Client: URS/ARUP/HMM JV
Project: California High Speed Train

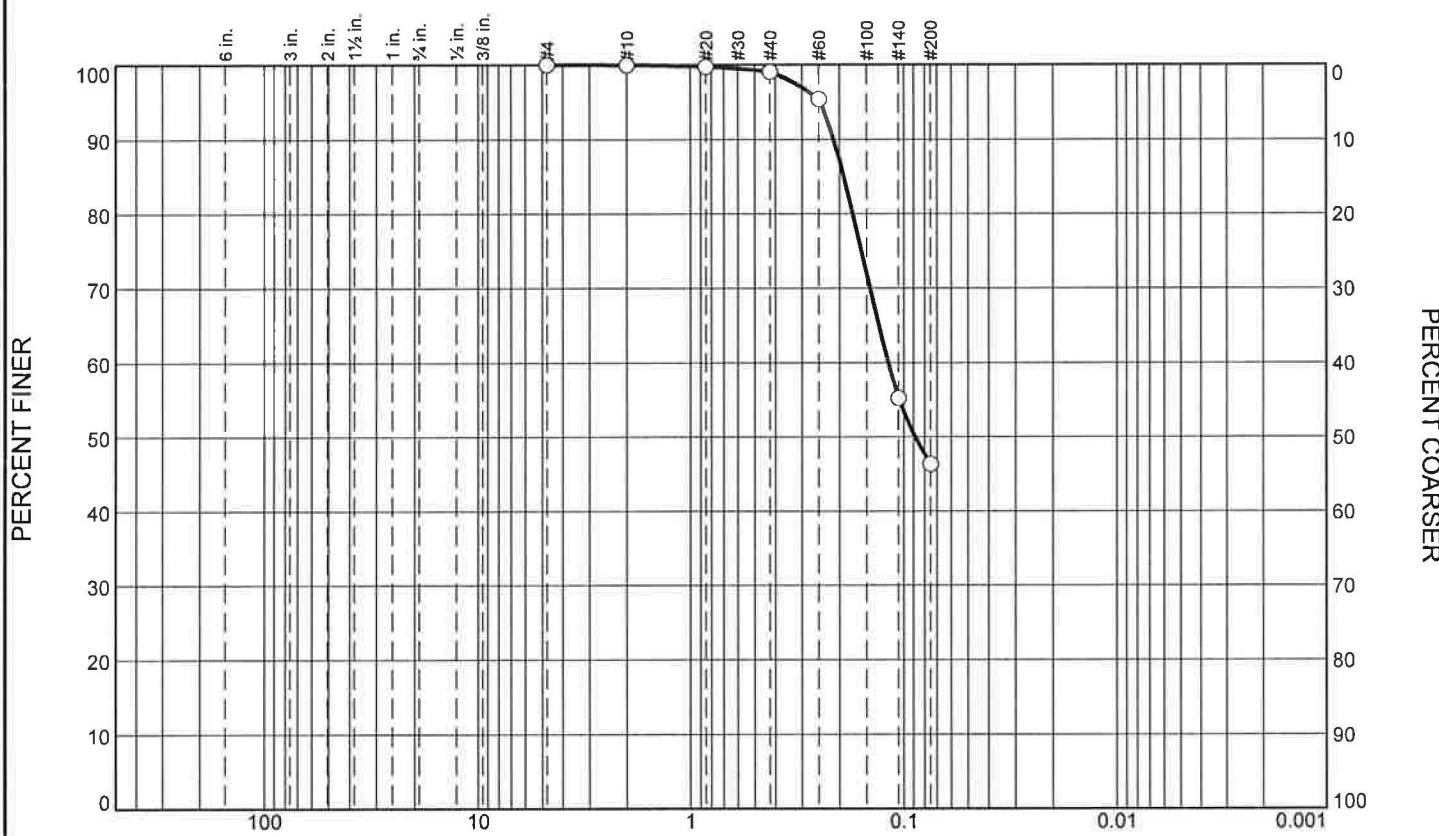
Project No: 2636-001.0

Figure

Tested By: PH

Checked By: PH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
	0	0	0	1	53	46	46

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	100		
#40	99		
#60	95		
#140	55		
#200	46		

* (no specification provided)

Soil Description		
Silty sand		
PL=	Atterberg Limits	PI=
D ₉₀ = 0.2140	LL=	
D ₅₀ = 0.0887	D ₃₀ =	D ₆₀ = 0.1188
D ₁₀ =	C _u =	D ₁₅ =
USCS=	C _c =	
	Classification	AASHTO=
F.M.=0.32	Remarks	

Source of Sample: S0029R G-52568
Sample Number: MC12-1

Depth: 51.0-51.5

Date: 09/13/13



Client: URS/ARUP/HMM JV
Project: California High Speed Train

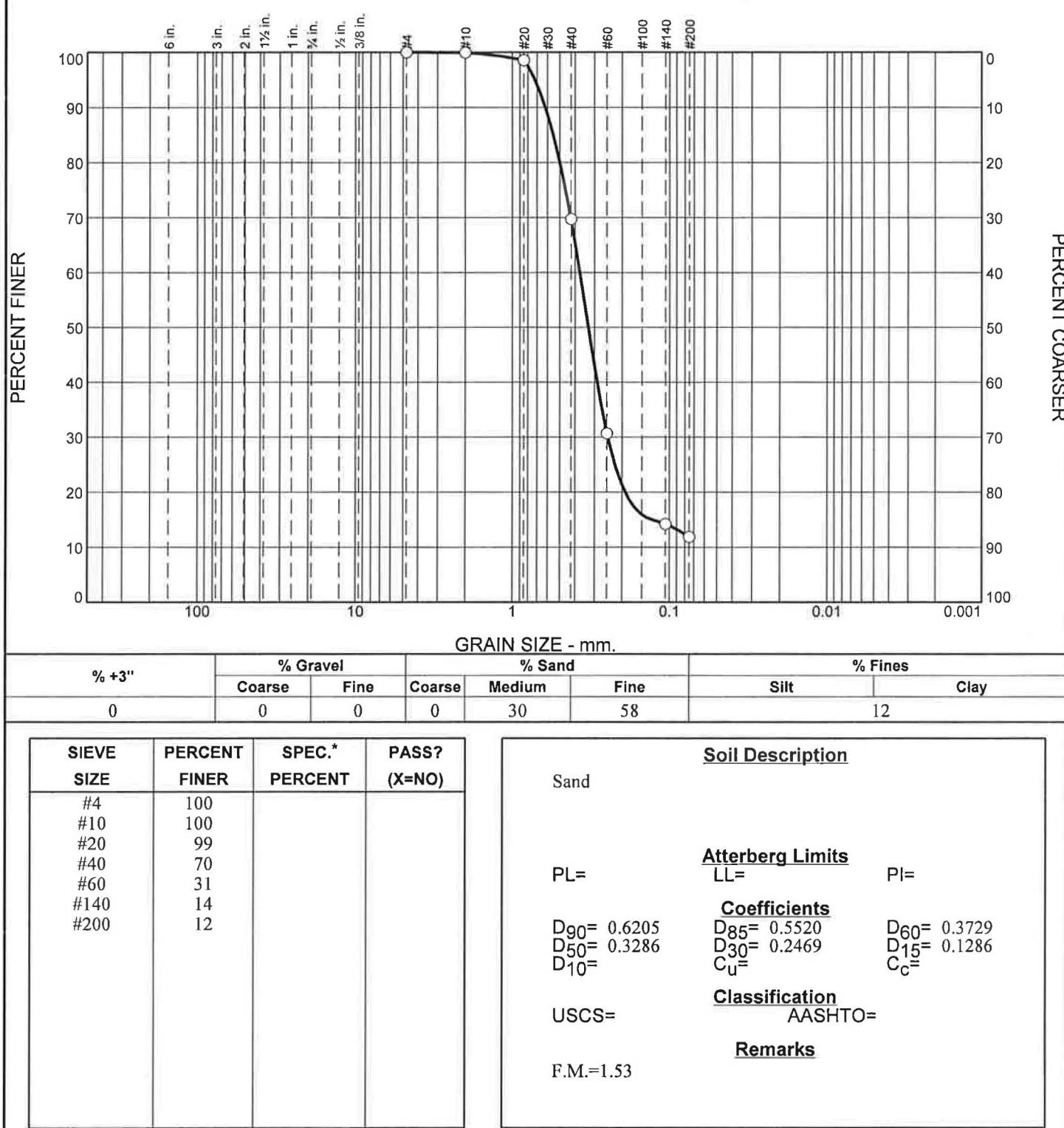
Project No: 2636-001.0

Figure

Tested By: PH

Checked By: PH

Particle Size Distribution Report



Source of Sample: S0029R G-52568
Sample Number: SS13

Depth: 56.0-56.5

Date: 09/13/13



Client: URS/ARUP/HMM JV
Project: California High Speed Train

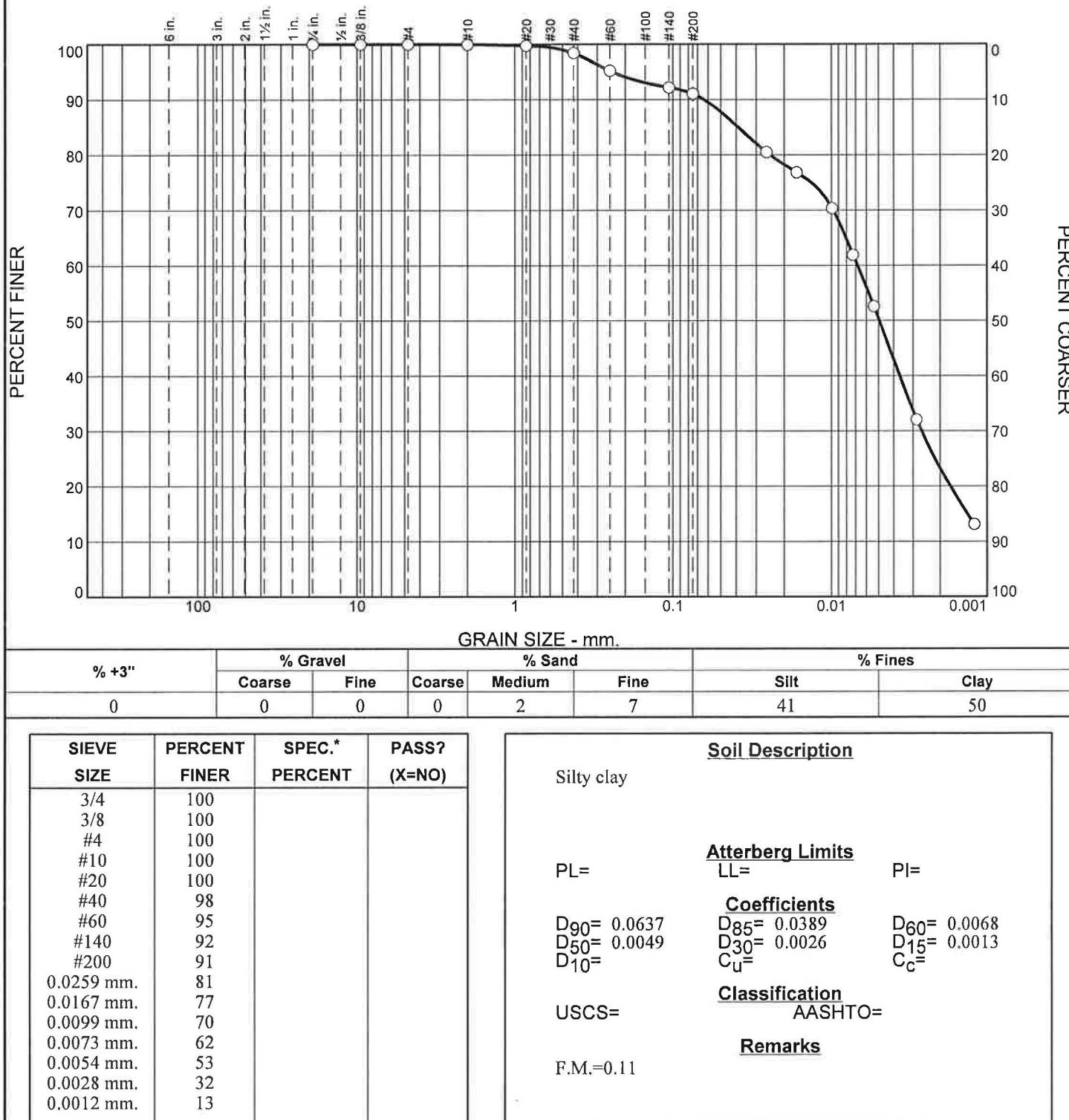
Project No: 2636-001.0

Figure

Tested By: PH

Checked By: PH

Particle Size Distribution Report



* (no specification provided)

Source of Sample: S0029R G-52568
Sample Number: SS15

Depth: 66.0-66.5

Date: 09/17/13



Client: URS/ARUP/HMM JV
Project: California High Speed Train

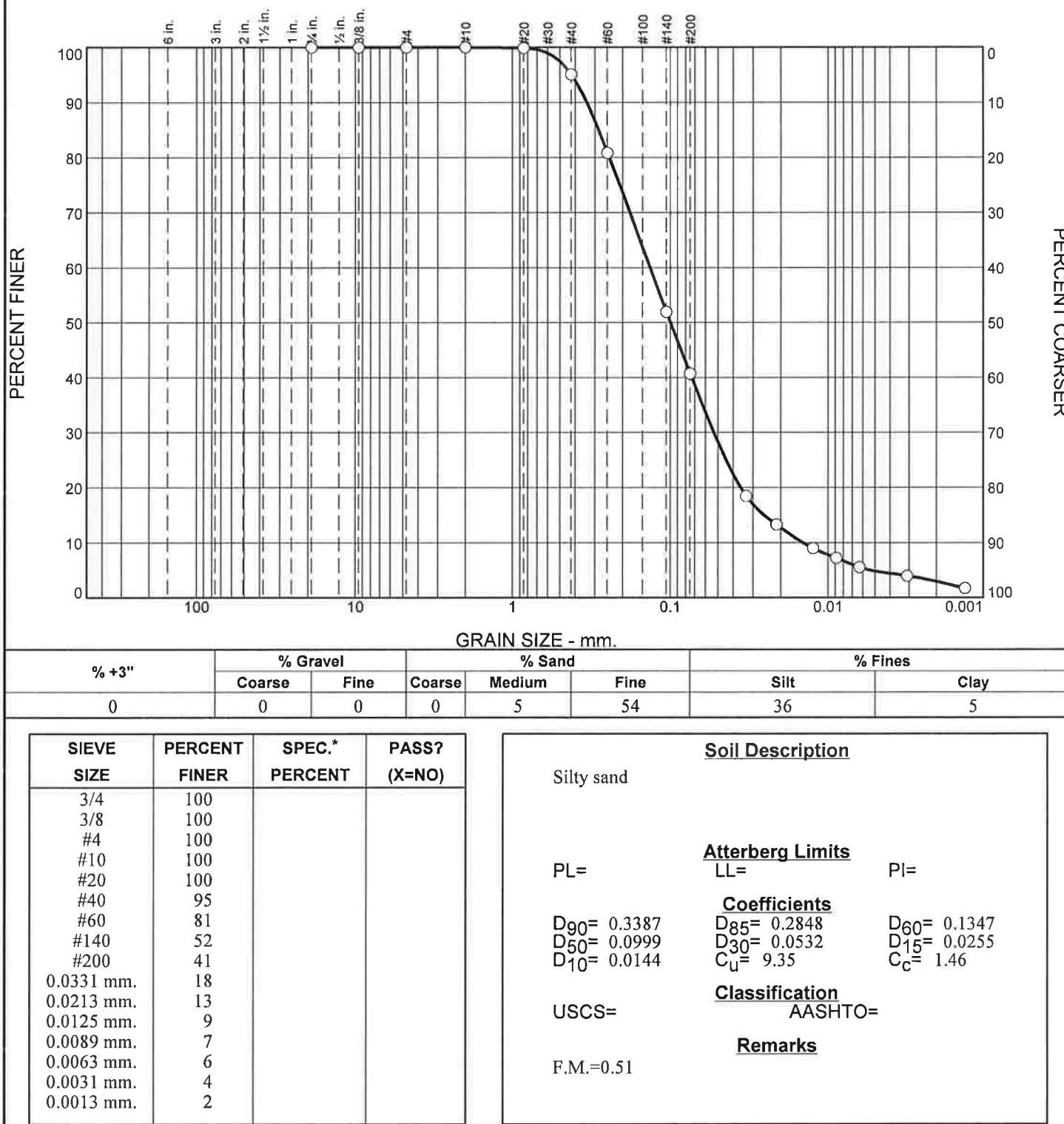
Project No: 2636-001.0

Figure

Tested By: PH

Checked By: PH

Particle Size Distribution Report



Source of Sample: S0029R G-52568
Sample Number: SS20

Depth: 86.0-86.5

Date: 9/19/13



Client: URS/ARUP/HMM JV
Project: California High Speed Train

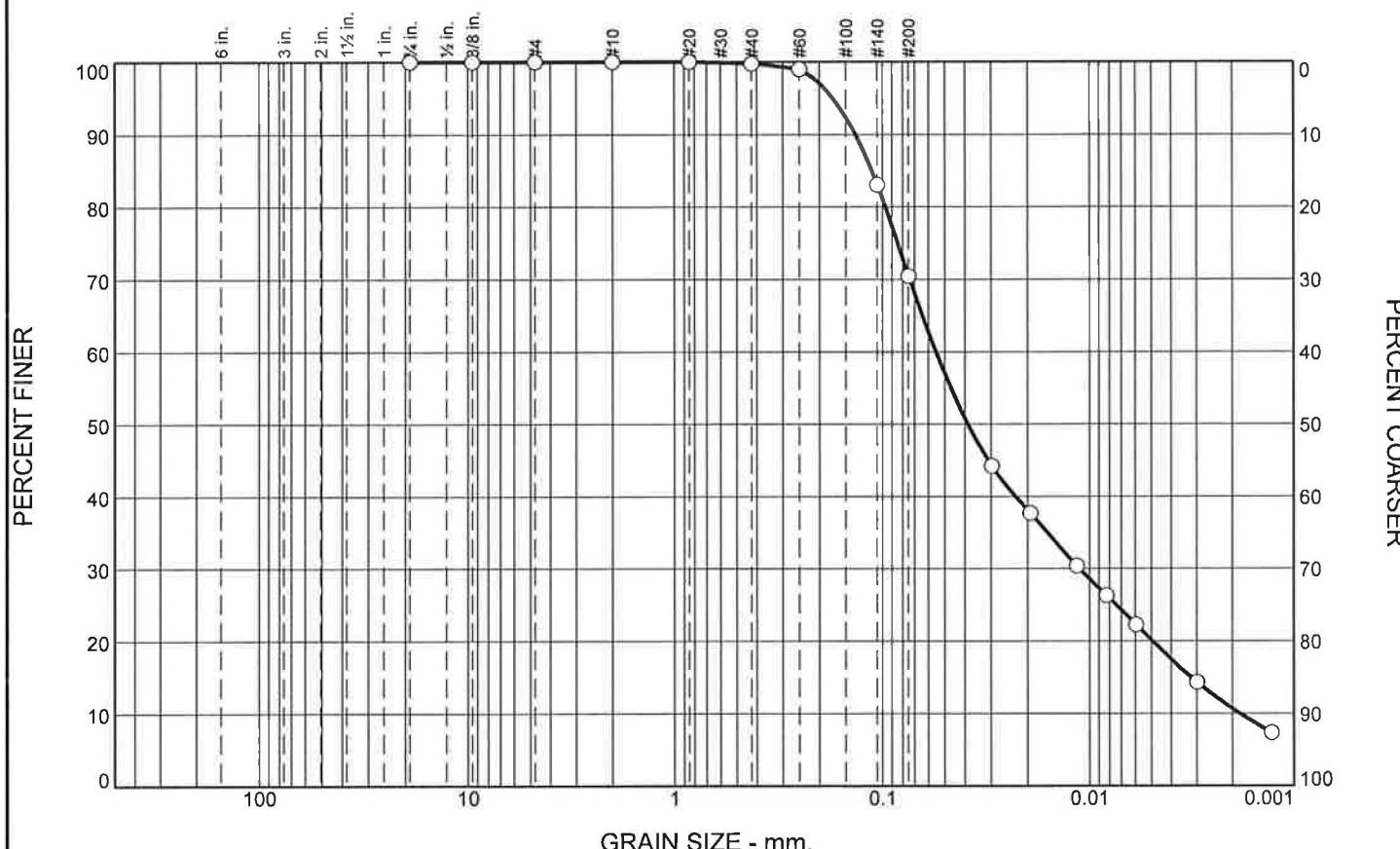
Project No: 2636-001.0

Figure

Tested By: PH

Checked By: PH

Particle Size Distribution Report



SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100		
3/8	100		
#4	100		
#10	100		
#20	100		
#40	100		
#60	99		
#140	83		
#200	70		
0.0298 mm.	44		
0.0194 mm.	38		
0.0115 mm.	30		
0.0083 mm.	26		
0.0059 mm.	22		
0.0030 mm.	14		
0.0013 mm.	7		

* (no specification provided)

<u>Soil Description</u>		
Sandy silt with clay		
PL=	<u>Atterberg Limits</u>	PI=
	LL=	
D ₉₀ = 0.1351	D ₈₅ = 0.1126	D ₆₀ = 0.0553
D ₅₀ = 0.0389	D ₃₀ = 0.0112	D ₁₅ = 0.0032
D ₁₀ = 0.0018	C _u = 30.17	C _c = 1.24
<u>Coefficients</u>		
<u>Classification</u>		
USCS=	AASHTO=	
<u>Remarks</u>		
F.M.=0.08		

Source of Sample: S0029R G-52568
Sample Number: SS22

Depth: 96.0-96.5

Date: 09/19/13



Client: URS/ARUP/HMM JV
Project: California High Speed Train

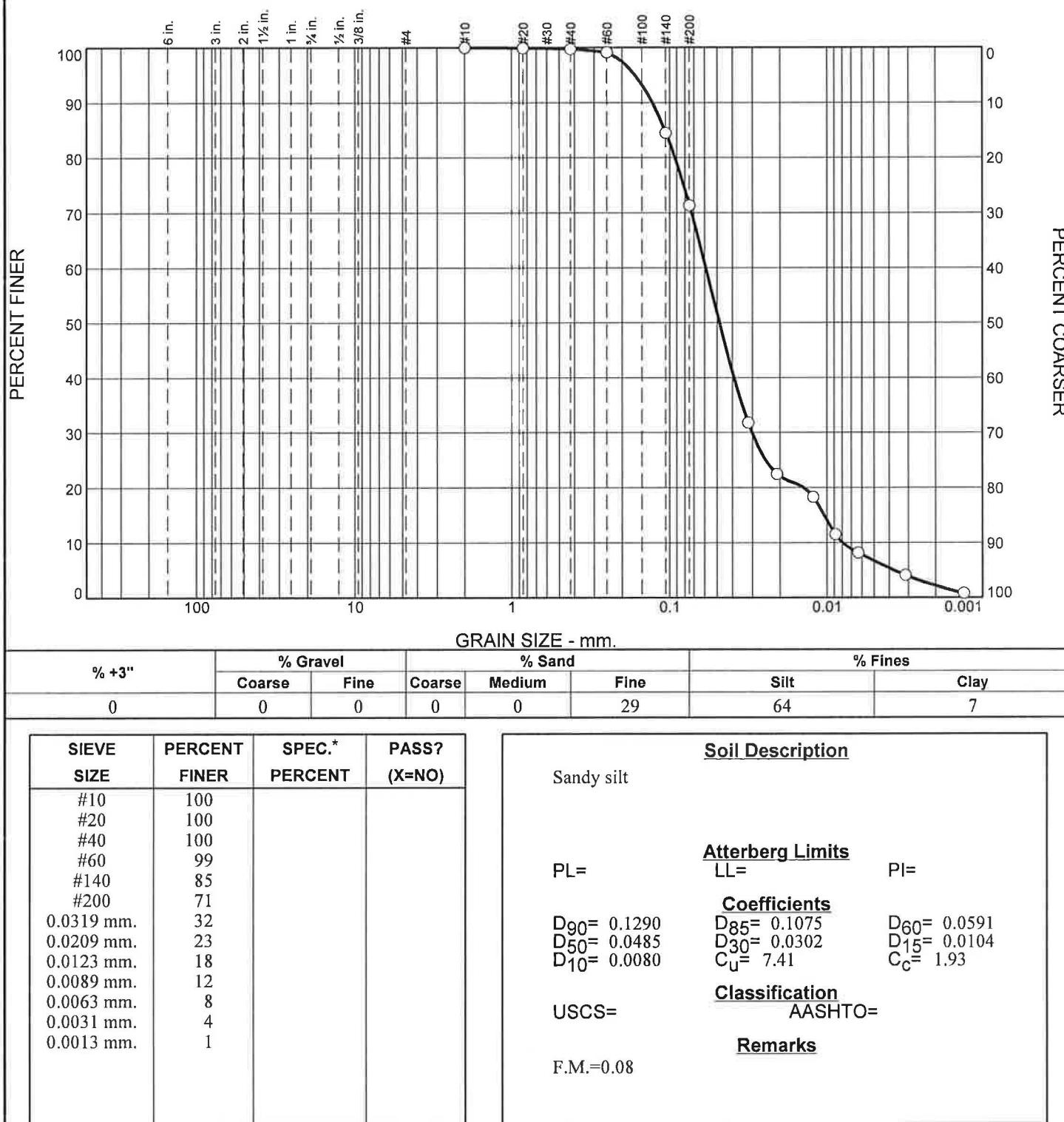
Project No: 2636-001.0

Figure

Tested By: PH

Checked By: PH

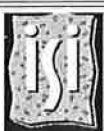
Particle Size Distribution Report



Source of Sample: S0029R G-52568
Sample Number: MC25-2

Depth: 110.5-111.0

Date: 9/23/13



Client: URS/ARUP/HMM JV
Project: California High Speed Train

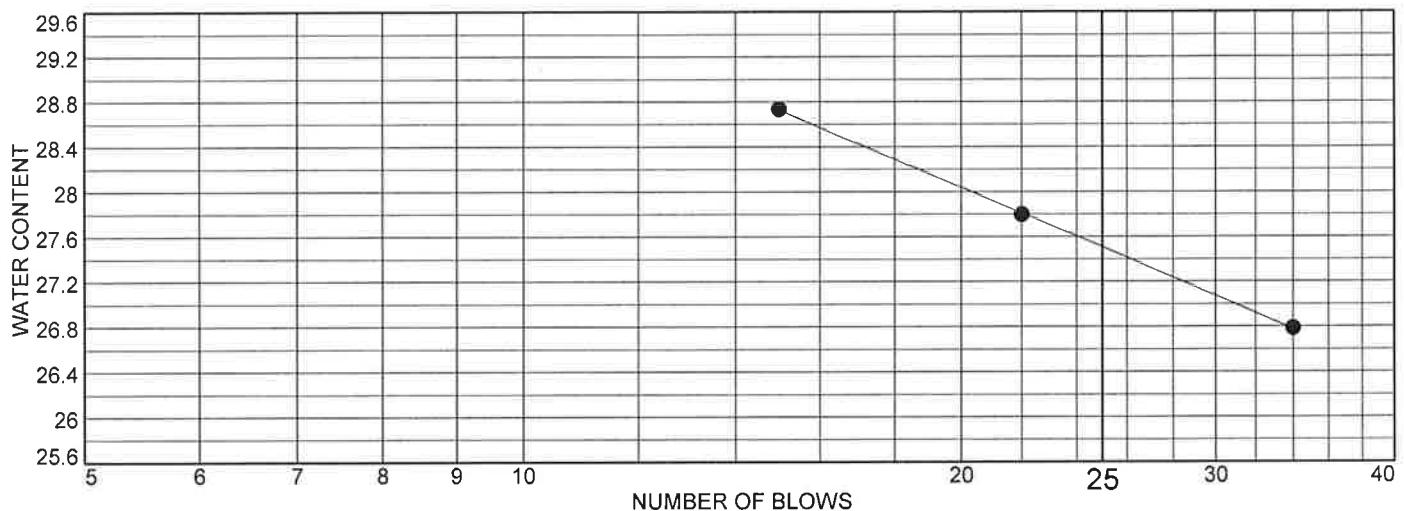
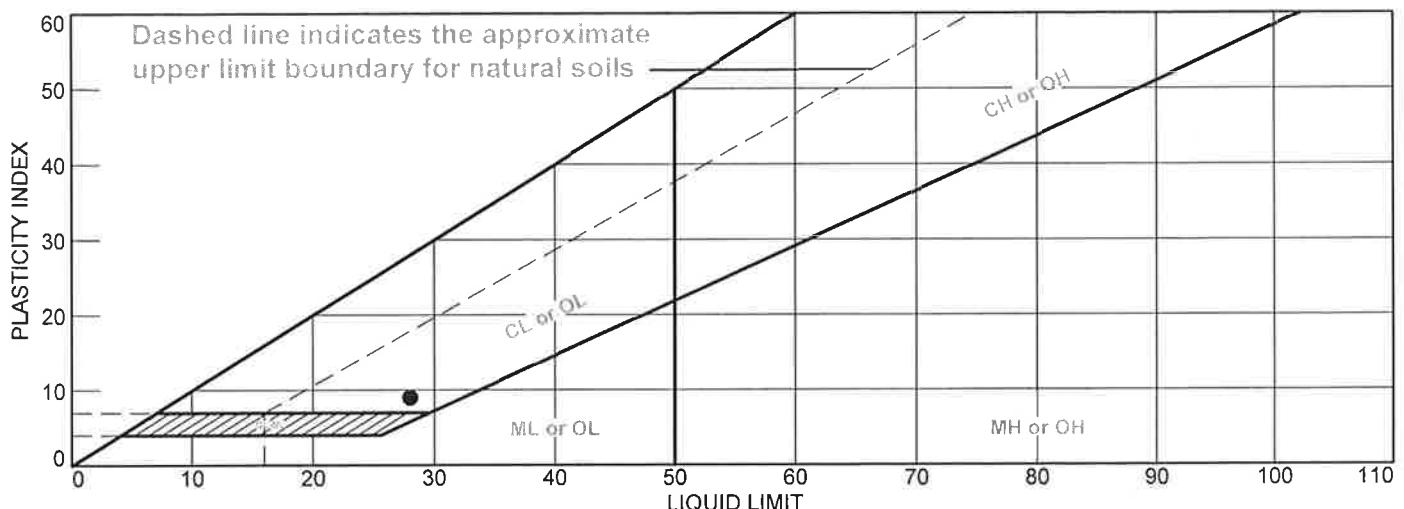
Project No: 2636-001.0

Figure

Tested By: PH

Checked By: PH

LIQUID AND PLASTIC LIMITS TEST REPORT



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
● Grayish brown silty clay	28	19	9			

Project No. 2636-001.0 Client: URS/ARUP/HMM JV

Remarks:

Project: California High Speed Train

● Source: S0029R G-52568 Depth: 41.0-41.5 Sample No.: MC09-2

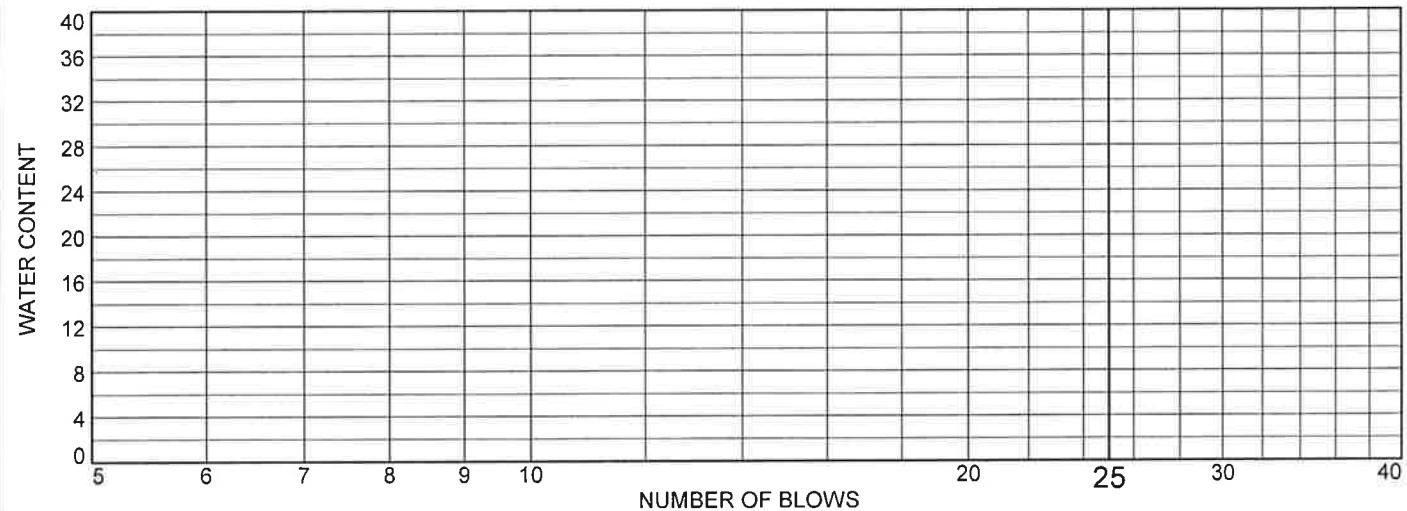
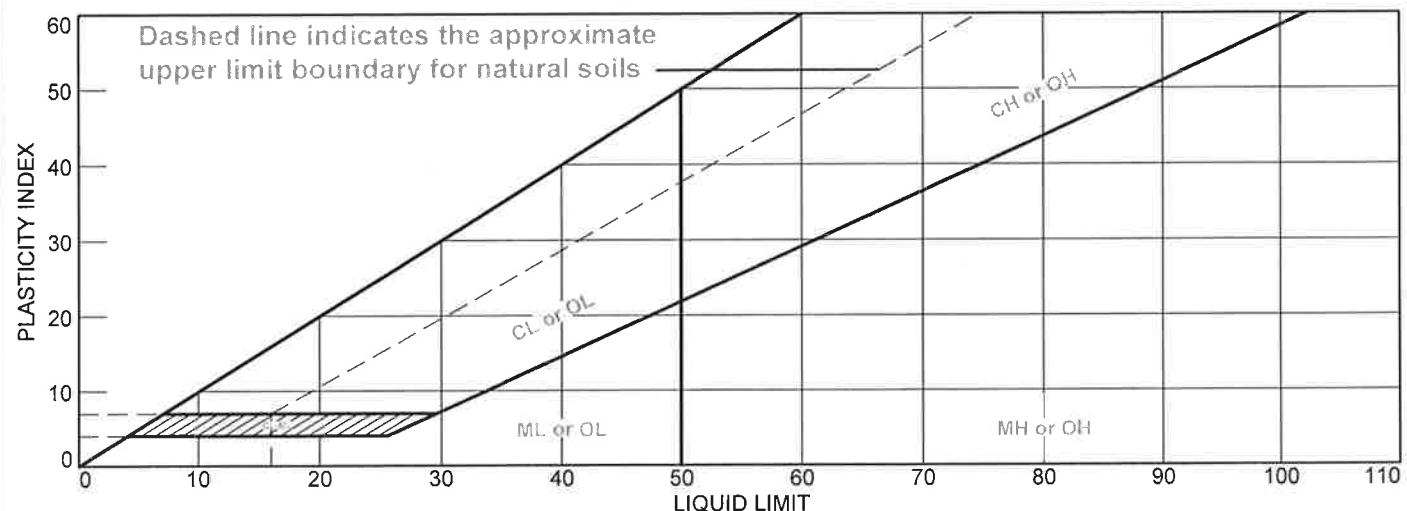


Figure

Tested By: JH

Checked By: PH

LIQUID AND PLASTIC LIMITS TEST REPORT



MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
• Olive brown sandy silt	NP	NP	NP	99	57	ML

Project No. 2636-001.0 Client: URS/ARUP/HMM JV

Remarks:

Project: California High Speed Train

• Source: S0029R G-52568 Depth: 42.0-44.5 Sample No.: U10

Figure

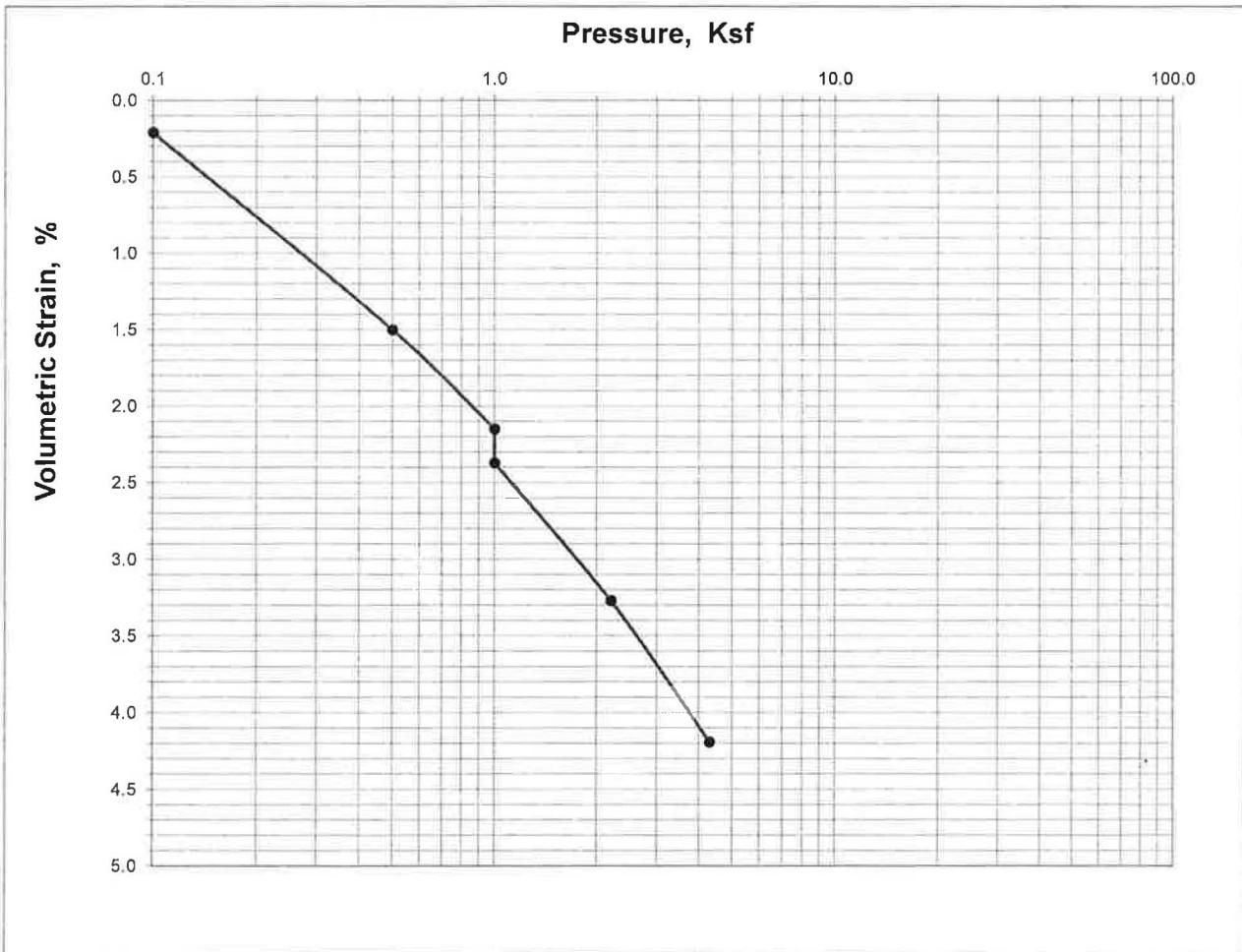
Tested By: JH

Checked By: PH

COLLAPSE TEST

Boring Number	S0029R	Sample Number	MC03-2	Depth (ft)	10.5-11.0		
Soil Description	Sand						
	Water Content, %	Dry Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity
Initial	20.1	94.3	0.787	68.9	1.00	2.420	(assumed)

Initial	20.1	94.3	0.787	68.9	1.00	2.420	(assumed)
Final	21.6	98.5	0.713	81.7			2.70



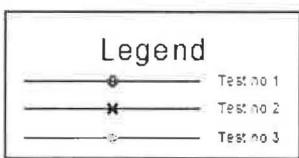
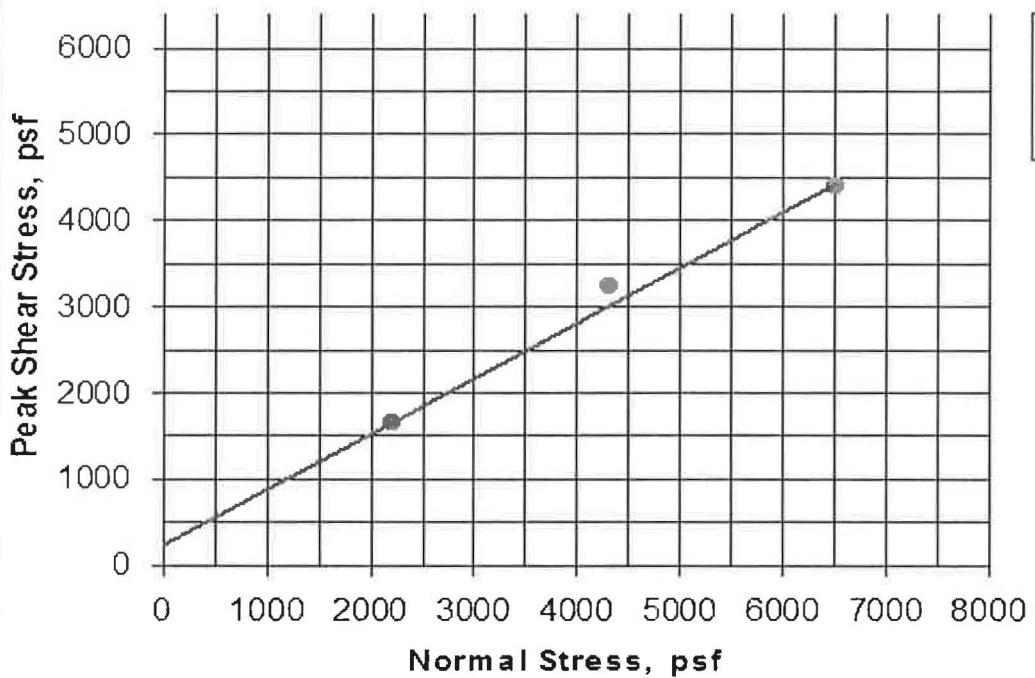
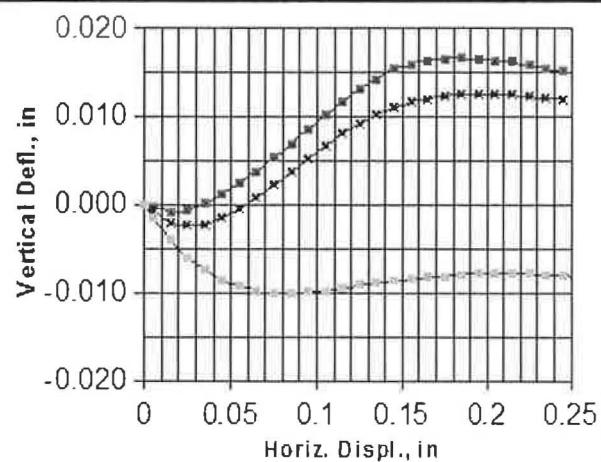
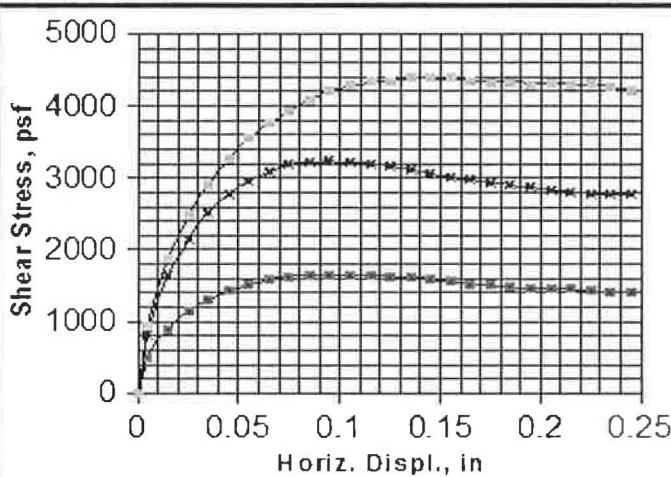
Direct Shear Moisture and Density Laboratory Results

wet density (pcf) = 104.7

dry density (pcf) = 92.8

moisture (%) = 12.8

Client: URS/ARUP/HMM JV	Boring #: S0029R	Sample #: MC03-1
Project: California High Speed Train	Depth (ft):	11.0-11.5
Project #: 2636-001.0 G-52568	Soil: MEDIUM SAND	
TEST REPORT:	Direct shear - inundated, consolidated, & drained test	



Results

$C = 250$ psf
 $\phi = 33$ deg.

$G_s = 2.70$
Type = undisturbed

trimming note: bottom of tube material was loose and dry

Test no.	Sign psf	Peak Shear str., psf	Displ. in.	Strain Rate in./hr	Initial MC %	Initial DD pcf	Initial Sat. %	Initial Void Ratio	Initial Ht. in.	Initial Dia. in.	Final MC %	Final DD pcf	Final Sat. %	Final Void Ratio	Final Ht. in.
1	2200	1656	0.090	0.18	17.4	92.5	57	0.822	1.00	2.416	14.1	93.9	48	0.794	0.985
2	4300	3240	0.095	0.18	15.1	93.4	51	0.804	1.00	2.416	19.5	95.4	69	0.767	0.979
3	6500	4404	0.145	0.18	10.7	86.9	31	0.940	1.00	2.416	22.4	92.9	74	0.815	0.936

Client: URS/ARUP/HMM JV	Boring #: S0029R	Sample #: MC03-1
Project: California High Speed Train	Depth (ft): 11.0-11.5	
Project #: 2636-001.0 G-52568	Soil: MEDIUM SAND	

TEST REPORT: Direct shear - inundated, consolidated, & drained test

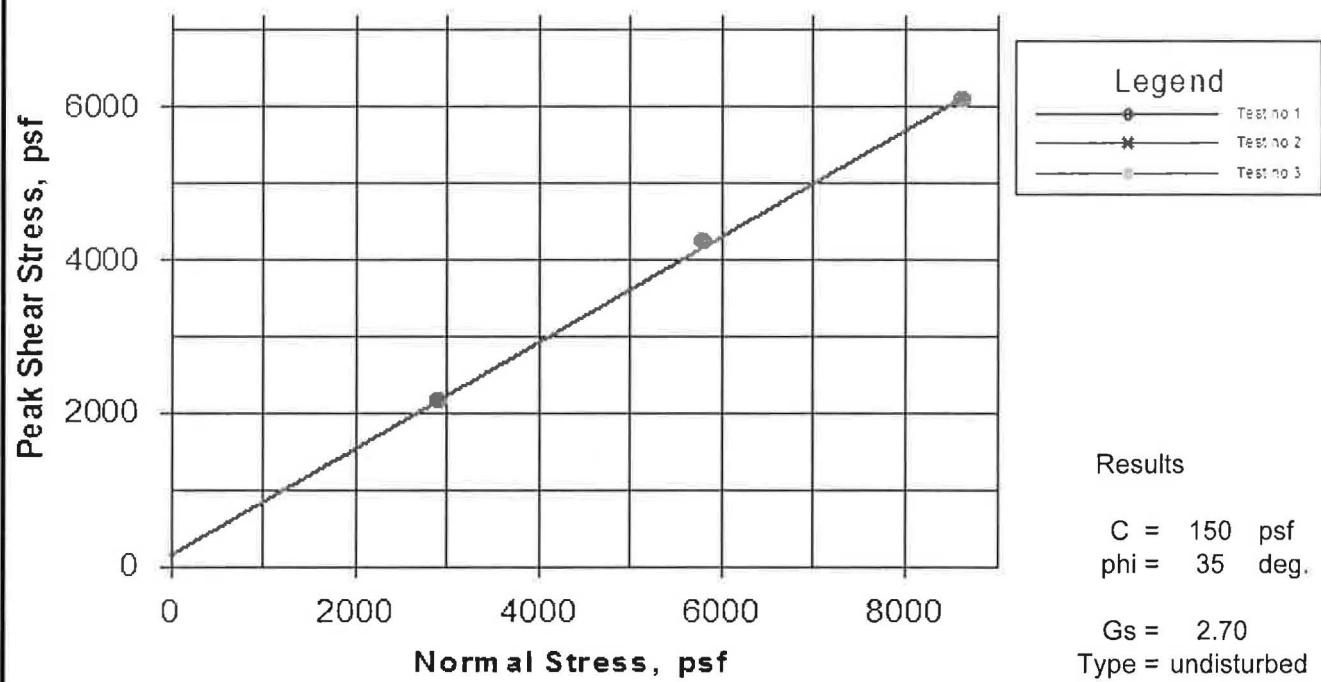
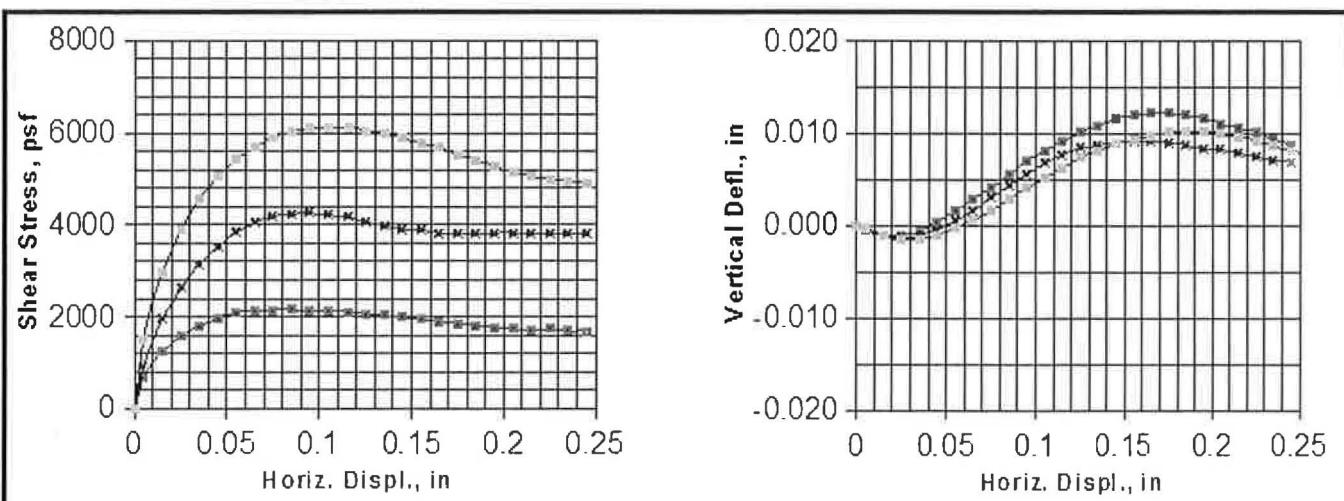
Direct Shear Moisture and Density Laboratory Results

wet density (pcf) = 112.5

dry density (pcf) = 100.0

moisture (%) = 12.5

Client: URS/ARUP/HMM JV	Boring #: S0029R	Sample #: MC05-1
Project: California High Speed Train	Depth (ft):	21.0-21.5
Project #: 2636-001.0 G-52568	Soil: COARSE, LOOSE SAND	
TEST REPORT:	Direct shear - inundated, consolidated, & drained test	



Test no.	Sign N psf	Peak Shear str., psf	Displ. in.	Strain Rate in./hr	Initial MC %	Initial DD pcf	Initial Sat. %	Initial Void Ratio	Initial Ht. in.	Initial Dia. in.	Final MC %	Final DD pcf	Final Sat. %	Final Void Ratio	Final Ht. in.
1	2900	2172	0.080	0.18	13.8	92.9	46	0.813	1.00	2.416	17.8	94.4	61	0.786	0.985
2	5800	4248	0.090	0.18	12.7	94.2	44	0.789	1.00	2.416	19.5	96.1	70	0.755	0.981
3	8600	6108	0.095	0.18	14.8	93.3	49	0.807	1.00	2.416	14.1	96.3	51	0.750	0.968

Client: URS/ARUP/HMM JV	Boring #: S0029R	Sample #: MC05-1
Project: California High Speed Train	Depth (ft): 21.0-21.5	
Project #: 2636-001.0 G-52568	Soil: COARSE, LOOSE SAND	

TEST REPORT: Direct shear - inundated, consolidated, & drained test

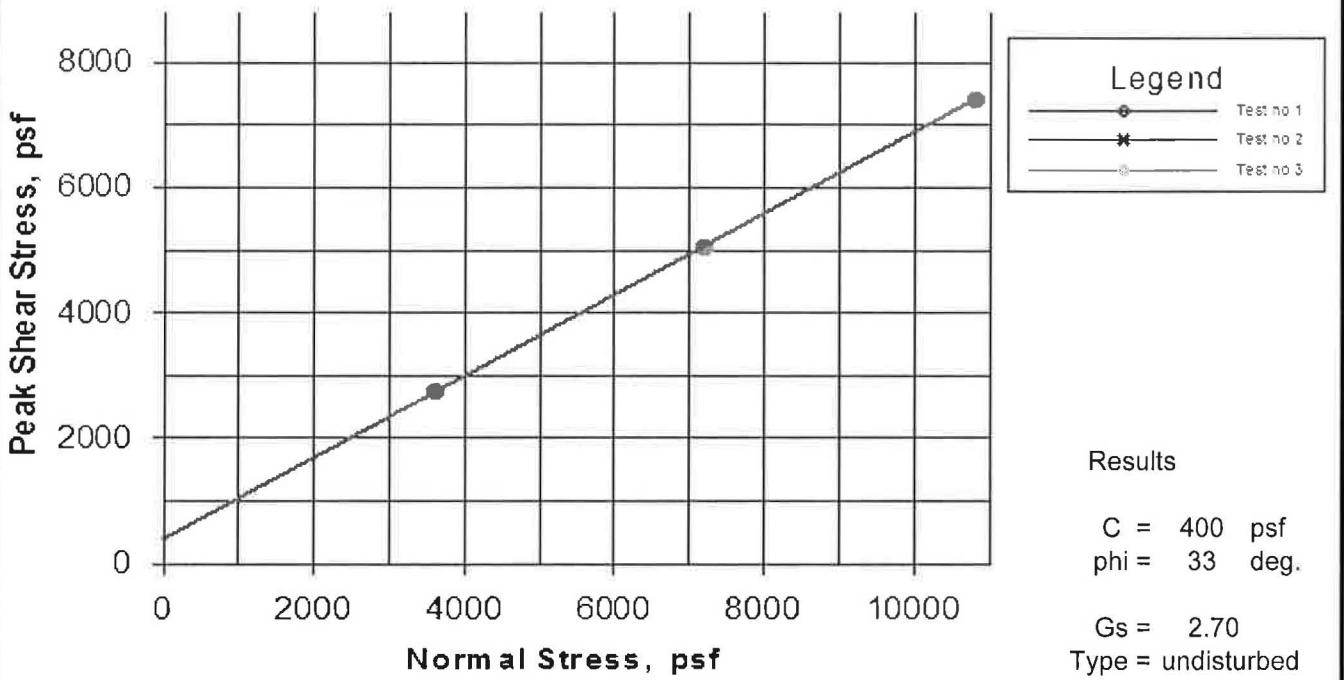
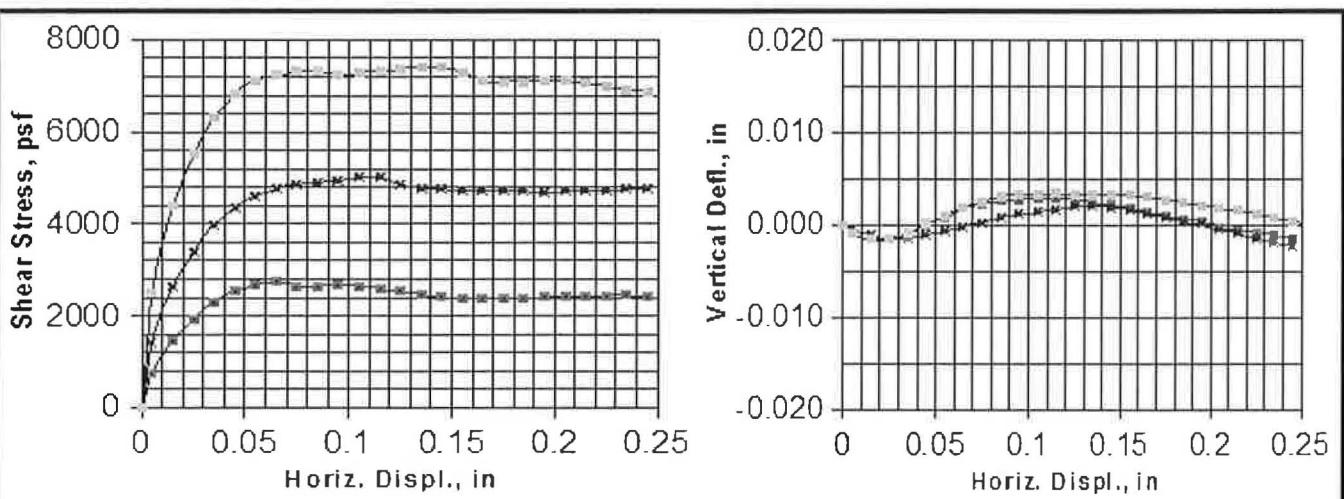
Direct Shear Moisture and Density Laboratory Results

wet density (pcf) = 134.9

dry density (pcf) = 115.9

moisture (%) = 16.4

Client: URS/ARUP/HMM JV	Boring #: S0029R	Sample #: MC09-1
Project: California High Speed Train	Depth (ft): 41.0-41.5	
Project #: 2636-001.0 G-52568	Soil: SANDY SILT	
TEST REPORT: Direct shear - inundated, consolidated, & drained test		



Test no.	Sign psf	Peak Shear str., psf	Displ. in.	Strain Rate in./hr	Initial MC %	Initial DD pcf	Initial Sat. %	Initial Void Ratio	Initial Ht. in.	Initial Dia. in.	Final MC %	Final DD pcf	Final Sat. %	Final Void Ratio	Final Ht. in.
1	3600	2748	0.065	0.09	17.4	111.7	92	0.509	1.00	2.416	15.5	115.1	90	0.464	0.970
2	7200	5040	0.110	0.09	17.2	113.3	95	0.487	1.00	2.416	15.3	117.6	95	0.433	0.963
3	10800	7404	0.140	0.09	16.1	116.0	96	0.453	1.00	2.416	15.5	117.9	97	0.429	0.984

Client: URS/ARUP/HMM JV Boring #: S0029R Sample #: MC09-1

Project: California High Speed Train Depth (ft): 41.0-41.5

Project #: 2636-001.0 G-52568 Soil: SANDY SILT

TEST REPORT: Direct shear - inundated, consolidated, & drained test

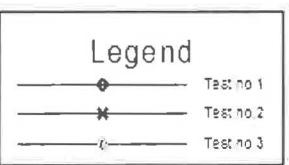
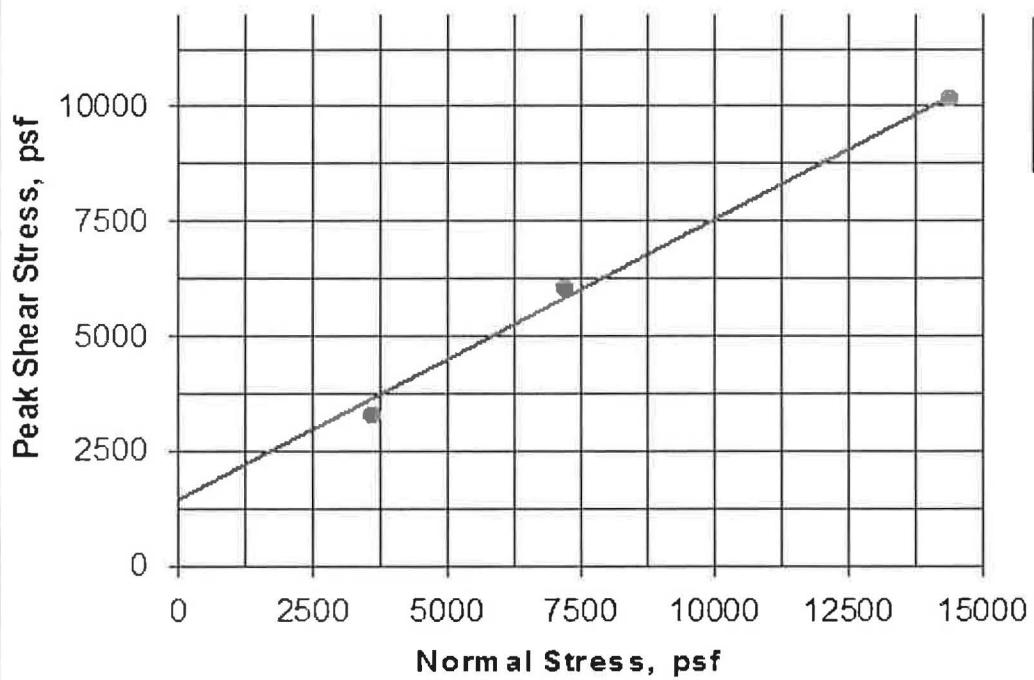
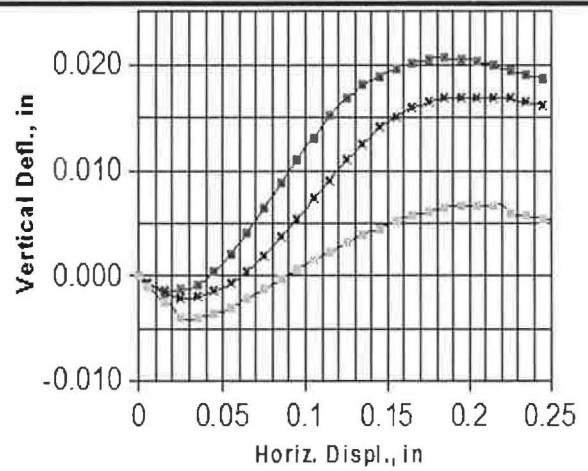
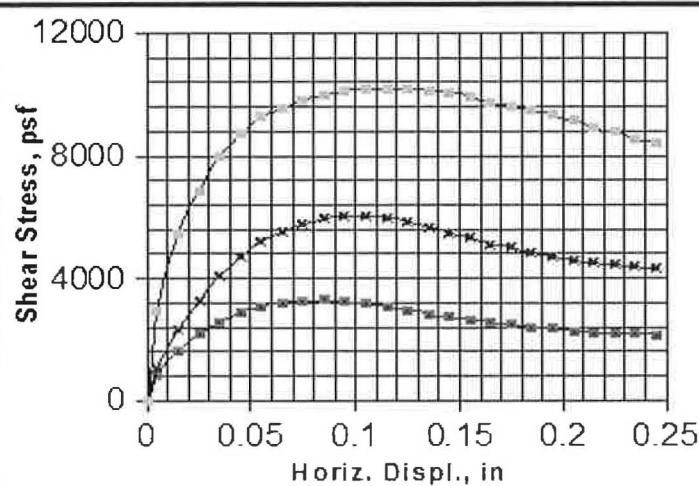
Direct Shear Moisture and Density Laboratory Results

wet density (pcf) = 106.0

dry density (pcf) = 94.7

moisture (%) = 12.0

Client: URS/ARUP/HMM JV	Boring #: S0029R	Sample #: MC14-1
Project: California High Speed Train	Depth (ft): 61.0-61.5	
Project #: 2636-001.0 G-52568	Soil: MEDIUM COARSE SAND	
TEST REPORT:	Direct shear - inundated, consolidated, & drained test	



Results

$C = 1450$ psf
 $\phi = 31$ deg.

$G_s = 2.70$
Type = undisturbed

Test no.	Sign N psf	Peak Shear str., psf	Displ. in.	Strain Rate in./hr	Initial MC %	Initial DD pcf	Initial Sat. %	Initial Void Ratio	Initial Ht. in.	Initial Dia. in.	Final MC %	Final DD pcf	Final Sat. %	Final Void Ratio	Final Ht. in.
1	3600	3300	0.085	0.18	29.6	84.1	80	1.003	1.00	2.416	21.4	84.7	58	0.990	0.993
2	7200	6036	0.095	0.18	11.3	98.5	43	0.711	1.00	2.416	15.5	100.8	62	0.672	0.978
3	14400	10202	0.120	0.18	12.7	95.6	45	0.763	1.00	2.416	14.2	101.3	58	0.665	0.944

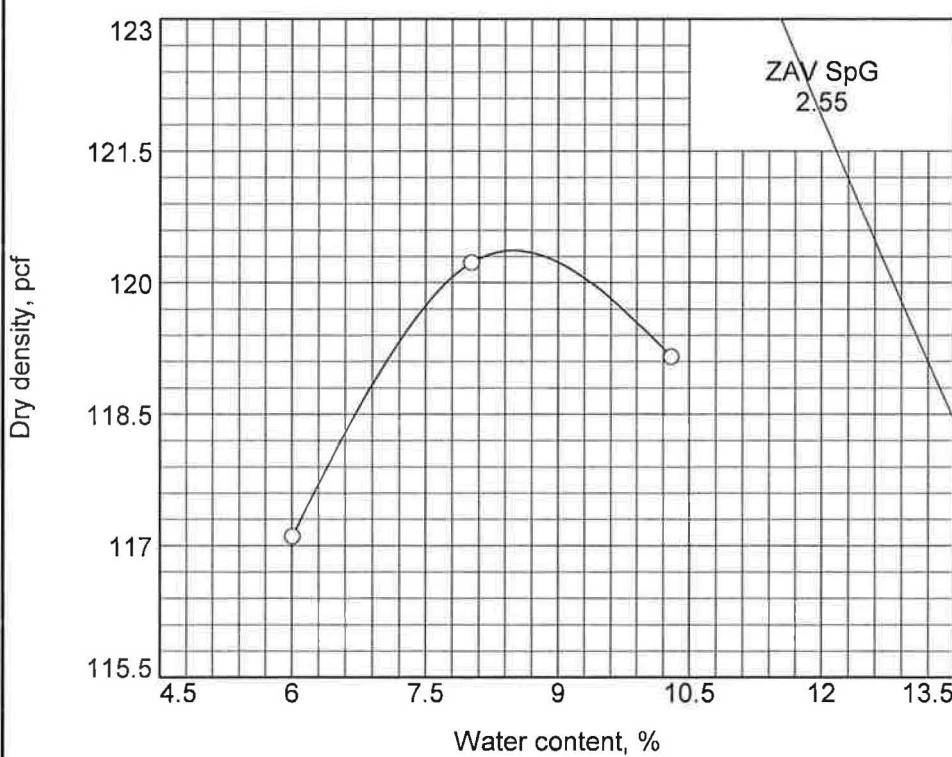
Client: URS/ARUP/HMM JV Boring #: S0029R Sample #: MC14-1

Project: California High Speed Train Depth (ft): 61.0-61.5

Project #: 2636-001.0 G-52568 Soil: MEDIUM COARSE SAND

TEST REPORT: Direct shear - inundated, consolidated, & drained test

COMPACTION TEST REPORT



Curve No.
52568

Test Specification:
ASTM D 1557-91 Procedure B Modified

Hammer Wt.: 10 lb.
Hammer Drop: 18 in.
Number of Layers: five
Blows per Layer: 25
Mold Size: 0.03333 cu. ft.

Test Performed on Material
Passing 3/8 in. Sieve

Soil Data
NM _____ Sp.G. _____
LL _____ PI _____
%>3/8 in. 0.0 %<#200 25
USCS _____ AASHTO _____

TESTING DATA						
	1	2	3	4	5	6
WM + WS	6196.4	6220.0	6109.3			
WM	4223.0	4223.0	4223.0			
WW + T #1	509.3	507.9	510.3			
WD + T #1	471.5	460.5	481.4			
TARE #1	0.0	0.0	0.0			
WW + T #2						
WD + T #2						
TARE #2						
MOISTURE	8.0	10.3	6.0			
DRY DENSITY	120.2	119.2	117.1			

TEST RESULTS	Material Description
Maximum dry density = 120.4 pcf	Silty sand
Optimum moisture = 8.5 %	
Project No. 2636-001.0 Client: URS/ARUP/HMM JV	Remarks:
Project: California High Speed Train	
Source: S0029R G-52568 Depth: 0-5 Sample No.: B-01	
	Figure



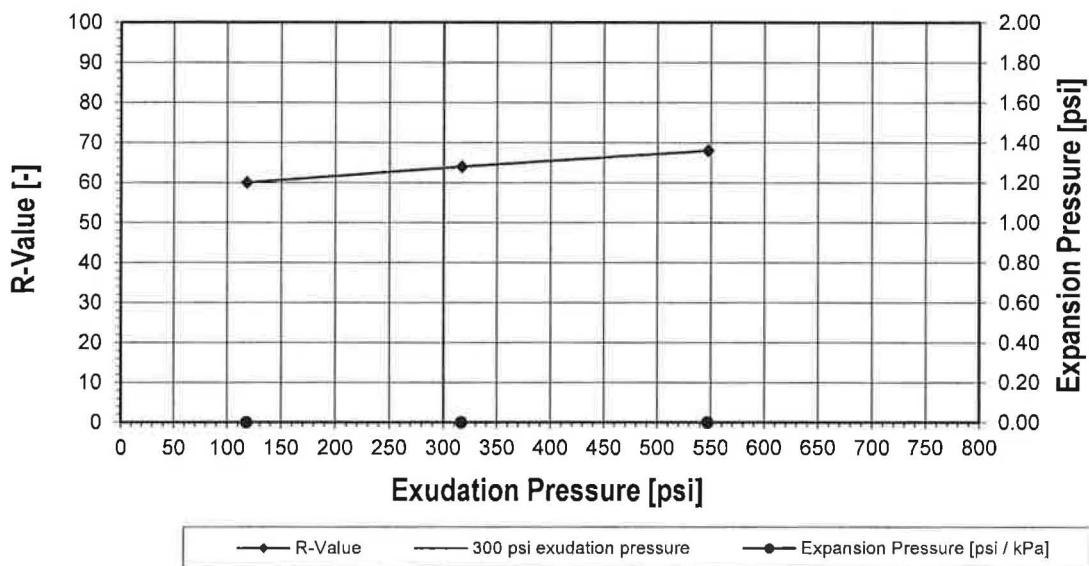
R-Value ASTM D2844 / CT301

Project Name: California High Speed Train
Client Name: URS/ARUP/HMM JV
Type of Material: Silty sand
Sampling Location: S0029R
Sample No.: B-01. 0.0 to 5.0
Test (ASTM D2844 / CT301):

ISI Project No.: 2636-001.0
ISI Lab No.: G-52568

Test Date: 9/16/13
Run By: LL
Checked By: LL/PH

Specimen #	1	2	3	
Compaction Pressure [psi / kPa]	250	----	275	----
Total Moisture [%]	10.5		9.8	9.2
Density[pcf]	118.0		121.5	123.8
Expansion Pressure [psi / kPa]	0.00	0.00	0.00	0.00
Horizontal Pressure at 160 psi [psi / kPa]	38	262	36	248
Number of Turns D [-]	4.60		4.41	4.20
Sample Height [in. / mm]	2.35	59.7	2.43	61.7
Exudation Pressure [psi / kPa]	118	814	317	2186
R-Value [-]	63.6		66.1	70.4
Corrected R-Value [-]	60.0		64.0	68.0



Corrected R-Value at 300 psi / 2.07 MPa Exudation Pressure =

63.0



Client: URS/ARUP/HMM JV
Clients Project No.: S0029R
Clients Project Name: California High Speed Train

Project No.: 2636-001.0
ISI Lab No.: G-52568
Date Received: 9/5/2013
Date Tested: 9/16/2013

CALIFORNIA BEARING RATIO
(ASTM D-1883)

Lab No.	G-52568		
Sample:	S-0029R / B-01		
Compaction Procedure:	D1557		
Maximum Dry Density pcf:	120.4		
Optimum Moisture Content %:	8.5		
Condition of CBR Soil Sample:	Soaked 96 hours		
% + 3/4" Size Replacement:	0	1	2
Dry Density Before Soaking pcf:	121	115.4	111.9
Percent Relative Compaction %:	100.5	95.8	92.9
Dry Density After Soaking pcf:	124.1	117.9	113
Moisture Content Before Compaction %:	8.7	8.6	8.7
Moisture Content After Compaction %:	8.7	8.6	8.7
Moisture Content Top 1" After Soaking %:	12.6	13	13.6
Average Moisture Content After Soaking %	10.8	12.2	13.5
Percent Swell %:	0.1	0	0
Bearing Ratio @ 0.100"	14	12	10
Bearing Ratio @ 0.200"	26	23	13
Surcharge Weight lbs.:	10	10	10

Specimens were compacted at optimum moisture content (determined in accordance with ASTM D1557) with varying amounts of compactive effort and then soaked for 96 hours with a 10 pound surcharge prior to penetration.

Specimen No.	Percent Relative Compaction	Bearing Ratio @ 0.1" Pen.	Bearing Ratio @ 0.2" Pen.	Bearing Ratio @ 0.3" Pen.	Bearing Ratio @ 0.4" Pen.	Bearing Ratio @ 0.5" Pen.	Percent Swell
	90	4	5	0	0	0	0
	95	12	21	0	0	0	0
	100	14	26	0	0	0	0.1

Per ASTM D-1883, when the bearing ratio at 0.2 inches is greater than the bearing ratio at 0.1 inches, use the bearing ratio at 0.2 inches.